October 1962
50¢

CQ

UNIVERSITY OF ILLINOIS
LIBRARY
OCT 5 1962
CHICAGO

Satellite Tracking at ZE5JJ– A Space Age Amateur

See Page 43.

The Radio Amateur's Journal

NO LONGER JUST A PICTURE

Collins' new 62S-1 VHF Converter is ready for your inspection — and here's why you'll it best: ☐ System engineered for the S-Line/KWM-2 ☐ Excellent cross mod rejection simple broad banding of front end for 200 kc tuning range ☐ Easy, accurate frequency re ☐ 1 kc calibration on VHF ☐ Power input 160 watts PEP or CW ☐ Same Size as KWM No additional power supply needed with S-Line or KWM-2 ☐ Provision for MARS operatic of amateur bands with the addition of crystals ☐ Simple to tune and operate ☐ For a closer see your distributor today!

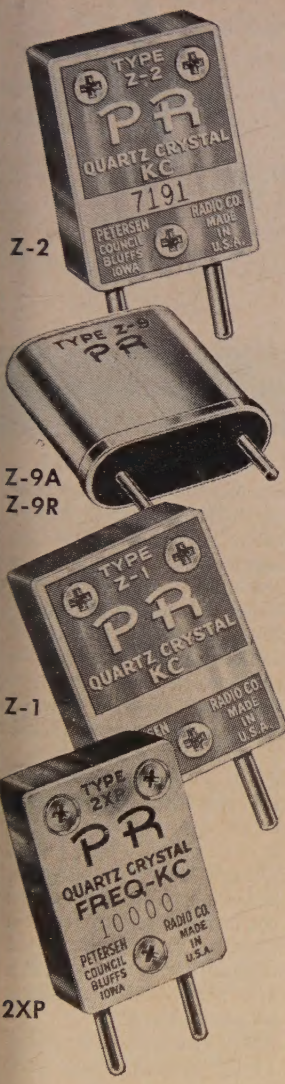
COLLINS

For further information, check number 1, on page 110

It pays to insist on

PR *crystals*

STANDARD OF EXCELLENCE SINCE 1934



Z-2

Z-9A
Z-9R

Z-1

2XP

AMATEUR TYPES

Fundamental, PR Type Z-2

Frequency Ranges in Kcs.: 3,500 to 4,000 (80M); 7,000 to 7,425 (40M); 8,000 to 8,222 (2M); 8,334 to 9,000 (6M).

Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting; ±500 cycles.....**$2.95** Net

(All Z-2 Crystals calibrated with a load of 32 mmfd.)

Third Overtone, PR Type Z-9A

Hermetically sealed; calibrated 24,000 to 24,666 and 25,000 to 27,000 Kc., ±3 Kc.; .050" pins.....**$3.95** Net

6 Meters, PR Type Z-9A

Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 Mc., ±15 Kc.; .050" pins. **$4.95** Net

CITIZENS BAND CLASS "D" Type Z-9R, Transmitter

FCC assigned frequencies in megacycles: 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225, 27.255, calibrated to .005%. (Be sure to specify manufacturer and model number of equipment) $2.95 Net

CITIZENS BAND CLASS "D" Type Z-9R, Receiver

Specify I.F. frequency, also whether receiver oscillator is above or below transmitter frequency. Calibrated to .005%. (Be sure to specify manufacturer and model number of equipment.).....$2.95 Net

Type Z-9R, Radio Control

FCC assigned frequencies in megacycles: 26.995, 27.045, 27.095, 27.145, 27.195, 27.255; calibrated to .005%. (Be sure to specify manufacturer and model number of equipment.).....$2.95 Net

Type 2XP

Suitable for converters, experimental, etc. Same holder dimensions as Type Z-2.

1600 to 12000 Kc., (Fund.) ±5 Kc.....**$3.45** Net

12001 to 25000 Kc. (3rd Overtone) ±10 Kc.....**$4.45** Net

COMMERCIAL TYPES

Commercial Crystals available from 100 Kc. to 70 Mc. Prices on request.

Type Z-1, MARS and CAP

Official assigned frequencies in the range. Calibrated to .005%. 1600 to 10000 Kc.....**$3.45** Net

Type Z 1, TV Marker

Channels 2 thru 13....**$6.45** Net

4.5 Mc. Intercarrier, .01%.....**$2.95** Net

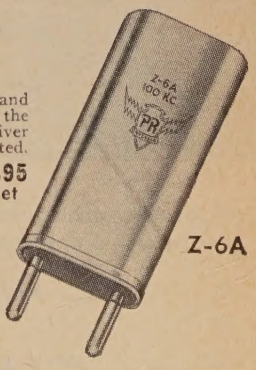
5.0 Mc. Signal Generator, .01%.....**$2.95** Net

10.7 Mc. FM, IF, .01%.....**$2.95** Net

Type Z-6A, Frequency Standard

To determine band edge. To keep the VFO and receiver properly calibrated.

100 Kc. ... **$6.95** Net



Z-6A

ALL PR CRYSTALS ARE UNCONDITIONALLY GUARANTEED. ORDER FROM YOUR JOBBER.

MINIMUM ORDER $10

PETERSEN RADIO CO., *Inc.* 2800 W. Broadway

COUNCIL BLUFFS, IOWA

For further information, check number 2, on page 110

HALLICRAFTERS MANAGEMENT:

"Can we build a **quality** receiver, capable of all important coverage from **85 kc through 30 mc,** with at least **3-step variable selectivity,** including a transmitter-type V.F.O. that can be **locked on frequency,** with sensitivity **under 1 mv** on the high frequency range, a high order of **mechanical** and **electrical stability,** that weighs under 20 lb., is extremely compact . . . and will sell for about **$400** ■ ?"

HALLICRAFTERS ENGINEERING:

"Yes."

SPECIFICATIONS:

Exceptionally versatile and com pact triple-conversion, supe heterodyne communication-ty receiver. **V.F.O.** can be used crystal locked oscillator; **Sele tivity:** Variable in 3 steps, 0.5 2.5—5.0 kc. Crystal-controlled and 3rd oscillators. Selecta sidebands, constant tuning ra **Sensitivity:** less than 1 mv. AM, less than ½ mv. on SSB/C **T-notch** for up to 50 db. atten tion to unwanted heterodyne I. F. pass band. I. F. type no limiter. Audio inverse feedba Crystals provided for 3.5—4 7.0—7.5, 14.0—14.5, 21.0—21 28.5—29 mc. Four addt'l. crys pos. for 500 kc. segments betwe 85 kc. and 30 mc. 100 kc. crys calibrator included. Size: 15" 17⅛" x 13". Net wt. 18 lb. Amat net price: $379.95.

HA-10 Low freq. tuner ada SX-117 for 85 kc.—3 mc. $24

Additional searching questions and exciting answers will be coming your way from Hallicrafters soon.

new SX-117 **Triple-conversion communication receiver by** *hallicrafter*

5th & Kostner Aves., Chicago 24, Ill.

Export: Hallicrafters, International Dept., Commercial Div., **Canada:** Gould Sales Co., Montreal, P.Q.

For further information, check number 3, on page 110

CQ The Radio Amateur's Journal

EDITORIAL STAFF

Editor
A. S. TROSSMAN, W2DTJ

Associate Editor
RICHARD A. ROSS, K2MGA

Technical Editor
IRVING TEPPER

Contributing Editors

Contest Calendar
FRANK ANZALONE, W1WY

Novice
WALT BURDINE, W8ZCV

USA-CA Custodian
CLIF EVANS, K6BX

Propagation
Space Communications
GEORGE JACOBS, W3ASK

RTTY
BYRON KRETZMAN, W2JTP

DX
URB LE JEUNE, W2DEC

YL
LOUISA B. SANDO, W5RZJ

Ham Clinic
C. J. SCHAUERS, W4VZO

V.H.F.
DON STONER, W6TNS

Sideband
DOT STRAUBER, K2MGE
IRVING STRAUBER, K2HEA

BUSINESS STAFF

Publisher
S. R. COWAN

Advertising Representatives
JACK SCHNEIDER, WA2FPE
DICK COWAN, WA2LRO

Circulation Manager
HAL WEISNER, WA2OBR

Production Manager
CARY L. COWAN

OFFICES

300 West 43rd Street
New York 36, N. Y.
Telephone, JUdson 2-4460

CQ—(Title registered U.S. Post Office) is published monthly by Cowan Publishing Corp. Second class postage paid at New York, N. Y. and at Garden City, New York. Subscription Rates: U.S.A. and Possessions, APO, FPO, Canada and Mexico: one year $5.00; two years $9.00; three years $13.00. Pan-American and foreign, one year $6.00; two years $11.00; three years $16.00. Printed in the U.S.A. Entire contents copyright 1962 by Cowan Publishing Corp. *CQ* does not assume responsibility for unsolicited manuscripts. **Postmaster: send Form 3579** to *CQ*, 300 W. 43rd St., N. Y. 36, N. Y.

VOL. 18, NO. 10 OCTOBER 1962

TABLE OF CONTENTS

A Combination S.W.R. Bridge and Amplifier Linearity Indicator ..... *H. C. Sherrod, W5ZG* 22

A Compact 6 Meter Transmitter
Gary M. Reuter, WØWWJ 25

New Amateur Products:
The FYO Key 26

DXpedition To Africa, Part III, Conclusion
George R. (Dick) McKercher, WØMLY 27

Results of the 6th Annual *CQ* W.W. S.E.B. Contest
Irv & Dorothy Strauber, K2HEA/K2MGE 30

A Combo Power Supply .... *Ralph J. Files, W2PWJ* 34

A Tuneable Audio Slot Filter
Artice M. Davis, K5RKJ 35

If The Bard Were On 20 Today . . .
Philip Bernstein, WA2DEL 36

S.S.B. Reception With A.M. Receiver
Don Selwyn, W2GFR 37

Voltage Regulation the Easy Way
Irving B. Mickey, W2LCB 39

A Space-Age Radio Amateur—ZE5JJ
H. E. Spaulding, W6BAF 43

A Simple, Stable 220 Mc Transmitter
Henry H. Brundage, KØHEI 45

The Instrument Deluxe
David T. Geiser, WA2ANU 47

DEPARTMENTS

Announcements	12	QSL Contest	18
Contest Calendar	56	RTTY	68
DX	51	Sideband	66
Ham Clinic	64	Space Communications	72
Ham Shop	104	USA-CA	74
Letters	8	VHF	61
Novice	70	YL	79
Propagation	58	Zero Bias	7

INTERNATIONAL **AMATEUR CRYSTALS**

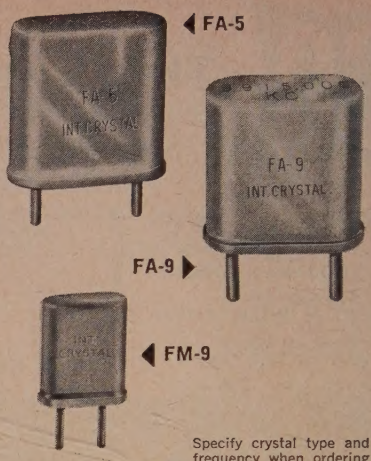
Amateurs throughout the world depend on International crystals for precision frequency control.

Manufactured by the same highly skilled craftsmen who produce International commercial crystals for the broadcast industry, two-way radio communication, and our space and missile program.

International Amateur Crystals
1000 kc to 137 mc — .01% tolerance

Wire mounted, plated and hermetically sealed in metal holders. FA-5 and FA-9 are HC/6U pin type. The FM-9 is an HC/18U pin type.

Priced from $3.30 to $10.00

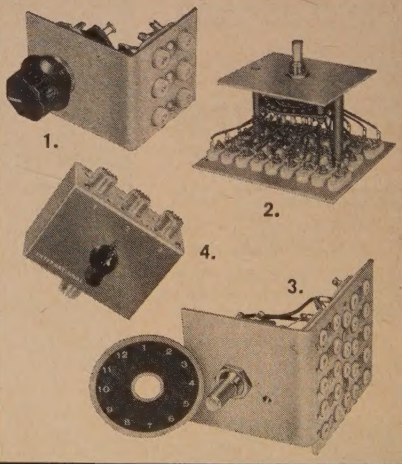


Specify crystal type and frequency when ordering.

	FA-5 and FA-9	FM-9
Fundamental	* 1000 - 1499 kc * 1500 - 1799 kc * 1800 - 1999 kc 2000 - 9999 kc 10000 - 14999 kc 15000 - 20000 kc	Not available Not available Not available 8000 - 9999.999 kc 10000 - 15000 kc 15001 - 19999.999 kc
Overtone (3rd)	10 - 14.99 mc 15 - 29.99 mc 30 - 59.99 mc	Not available 20 - 39.99 mc 40 - 59.99 mc
Overtone (5th)	60 - 75.99 mc 76 - 99.99 mc Not available	60 - 89.99 mc 90 - 100 mc 101 - 109.99 mc
Overtone (7th)	100 - 137 mc	110 - 137 mc

* Allow three to four day processing.

the PERFECT combination for FREQUENCY CONTROL



INTERNATIONAL **CRYSTAL SWITCHES**

When you design or build . . . combine International crystals and crystal switches. Switches available from 3-position to 24-position. For antennas and laboratory work use International coaxial switches.

Priced from $2.75 to $19.50

1. S-121 Triple Socket Crystal Switch. Cat. No. 150-126.
2. AC-44 Single Pole, 24-Position Crystal Switch. Cat. No. 150-131.
3. 12-Position Crystal Switch. Cat. No. 150-163.
4. 3-Position Coaxial Switch. Cat. No. 100-112.

Write today for International's Free catalog of precision made crystals and equipment.

INTERNATIONAL CRYSTAL MFG. CO., INC.

18 NORTH LEE • OKLAHOMA CITY, OKLAHOMA

For further information, check number 4, on page 110

your choice of 2 GREAT EICO® TRANSMITTERS...

designed by Hams... for Hams...

to the highest Ham standards

90-WATT CW TRANSMITTER* #720
Kit $79.95 Wired $119.95
*U.S. Pat. #D-184,776
"Top quality"—ELECTRONIC KITS GUIDE
Ideal for veteran or novice. "Clean" 90W CW, 65W AM-phone with EXT plate modulation. 80 through 10 meters.

60-WATT CW TRANSMITTER #723
Kit $49.95 Wired $79.95
"Compact; well-planned layout. Clean-sounding, absolutely hum-free carrier; stable." — ELECTRONICS WORLD.
Perfect for novice or advanced ham needing low-power standby rig. "Clean" 60W CW, 50W AM-phone with EXT plate modulation. 80 through 10 meters.

TRANSISTOR CODE PRACTICE OSCILLATOR #706
Complete with battery Select variable tone, flashing light, or both together. Phone jack for private use. Efficient speaker: clean loud signals.
Kit $8.95 Wired $12.95

New! **CITIZENS BAND WALKIE-TALKIE #740**
Complete with rechargeable battery and charger. 9 transistors, 1 diode. Full superhet. U.S. made.
Kit $54.95
Wired $79.95

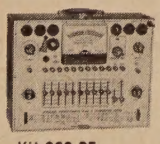
CITIZENS BAND TRANSCEIVERS 770 Series U. S. Pat.
Superhet; prealigned xmitter osc; match antennas by variable "pi" network. Single & multi-channel models.
From Kit $79.95 Wired $109.95

HIGH-LEVEL UNIVERSAL MODULATOR-DRIVER #730
Kit $49.95 Wired $79.95
Delivers 50W undistorted audio for phone operation. Can plate-modulate transmitters having RF inputs up to 100W. Unique over-modulation indicator. Cover E-5 $4.50.

GRID DIP METER #710
Kit $29.95 Wired $49.95
Includes complete set of coils for full band coverage. Continuous coverage 400 kc to 250 mc. 500 ua meter.

PEAK-TO-PEAK VTVM #232 *U. S. Pat.
& exclusive *UNI-PROBE®
Kit $29.95
Wired $49.95
VACUUM TUBE VOLTMETER #221
Kit $25.95 Wired $39.95

DC-5MC LAB & TV 5" OSCILLOSCOPE #460
Kit $79.95
Wired $129.50
5" GENERAL PURPOSE SCOPE #427
Kit $69.95 Wired $109.95



DYNAMIC CONDUCTANCE TUBE & TRANSISTOR TESTER #666
Kit $69.95 Wired $109.95
TUBE TESTER #625
Kit $34.95 Wired $49.95

RF SIGNAL GENERATOR #324 (150kc-435mc)
Kit $26.95
Wired $39.95
TV-FM SWEEP GENERATOR & MARKER #368
Kit $69.95 Wired $119.95

EICO®
ELECTRONIC INSTRUMENT CO., INC.
3300 NO. BLVD., L.I.C. 1, N. Y.
Export Dept., Roburn Agencies, Inc.
431 Greenwich St., N.Y. 13, N.Y.

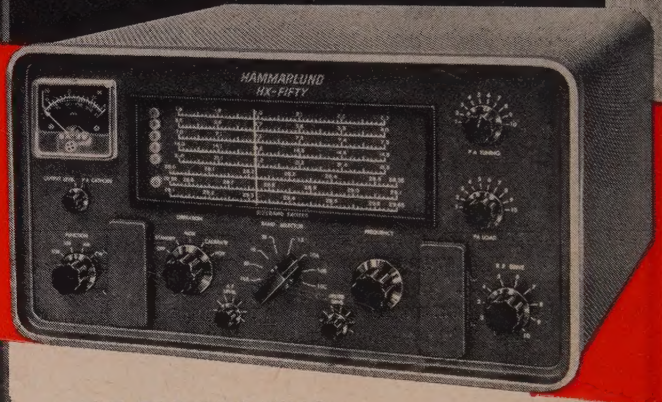
EICO, 3300 N. Blvd., L.I.C. 1, N. Y. CQ-10
☐ Send free Catalog & name of neighborhood distributor.
☐ Send free "Short Course for Novice License." ☐ Send 36-page STEREO HI-FI GUIDE: 25c enclosed for postage & handling.
Name.....
Address.....
City.....Zone.....State.....
Add 5% in the West.

ENGINEERS: Excellent career opportunities in creative electronics design. Write to the Chief Engineer.

For further information, check number 5, on page 110

READY...
to startle the amateur world!

the fabulous HAMMARLUND HX-50



OUTSTANDING FEATURES

VOX & Push-To-Talk Circuitry.

Output Power—Two-tone SSB and CW—50 watts at 10 meters to 65 watts at 80 meters for conservatively rated input of 90 watts DC, 130 watts P.E.P. AM is 25% of SSB/CW values.

3 element Pi network variable output circuit (40 to 80 ohms).

5 position switch for internal or external VFO plus three crystal control frequencies suitable for Novice, MARS, C.A.P., etc.

Built-in antenna changeover, VOX and break-in keying.

Amateur Bands Covered—80, 40, 20, 15 and 10 meters. 160 meter band position provided for use with optional kit.

Complete passband coupler design used throughout low-level stages provides minimum 1 MC bandwidth at the following frequency ranges: 3.2 to 4.2 MC; 6.9 to 7.9 MC; 13.8 to 14.8 MC; 20.8 to 21.8 MC; 27.0 to 31.0 MC.

FOR EVERYTHING YOU WANT IN A TRANSMITTER... AND ***MORE.***

Here is a new, compact, filter-type transmitter you will just have to try to believe! Loaded with design extras to give you more-for-the-money features, the FABULOUS HX-50 upgrades every known standard for operating ease and efficiency.

If you have ever entertained the thought of buying a new transmitter—if you want to move up to the very pinnacle of performance—for only modest cost . . . RUSH to the Authorized Hammarlund distributor nearest you to TRY and BUY the most exciting transmitter in Amateur Radio History.

Just as there is no substitute for quality—there is none for the intrinsic reliability and trust of a famous name—and **Hammarlund** has been a World Leader in communications equipment since 1910.

Leading Hammarlund Distributors have the Fabulous HX-50 in stock . . . READY RIGHT NOW! Convince yourself that this is the very best transmitter you can buy . . . at anywhere near the price!

$399.50
amateur net

Established 1910

HAMMARLUND
MANUFACTURING COMPANY
A Giannini Scientific Company
53 West 23rd Street, New York 10, N.Y.

ZERO BIAS

MR. LEONARD S. Kolsky, attorney, and chief of the Public Safety Division's rules and Standards Branch of the Federal Communications Commission, speaking at the recent ARRL National Convention held in Portland, Oregon, expressed his unofficial opinion that the ever-increasing demand on the high-frequency spectrum by users and potential users of radio has placed the Commission in the predicament of where to look for further room for expansion.

It appears that the Commission has, for years, been leaning over backwards in an effort to preserve amateur frequencies; undoubtedly through the efforts of the Headquarters staff and particularly Mr. Paul Segal, the Leagues able Council in Washington, up until a short time ago. It now appears that the pressing demands made upon the Commission to seek further expansion of the high-frequency and very high frequency spectrum will soon near saturation.

Commercial users of the radio spectrum, as you probably know, are usually assigned a single frequency. Their equipment is not normally designed to tolerate the QRM with which we are familiar and therefore, they are customarily assigned a "buffer zone" in order to avoid local interference. As more and more frequencies are requested by both the military and civilian organizations where can the FCC turn for their precious space?

Mr. Kolsky said, "It appears to many of us at the Commission that too much amateur time and energy is being dissipated in quarreling among yourselves over the merits of c.w. versus voice or whether a W prefix is preferable to a K, instead of concentrating on demonstrating to the Commission that you are utilizing your assigned frequencies in an efficient, intelligent manner and that it is in the public interest to have frequencies available for ham operation." If the statement isn't a reflection of cold sobering fact, we've never heard one.

By gosh, do you mean to tell us that those guys in Washington actually listen to what's going on on the air? Are they really interested in seeing amateurs perform public service and "intelligent" operating? You bet your sweet transmission line they do!

It may come as a surprise to some to find that the chief of the Amateur and Citizens Radio Division of the FCC, along with many of his assistants are licensed radio amateurs. In their positions, however, they are Civil Servants *first* and amateurs *second*. They have a duty to perform to the nation and to the Commission and if the amateur operator doesn't soon recognize this, then perhaps we are in jeopardy of losing the tremendous prestige the League has advanced for so long. We cannot expect the Commission to continue using sentiment in guiding the judgements toward the amateur service.

Amateur violations from Washington cross our desk regularly. In an effort to retain their "leaning over backwards" policy, 99% of violations cited continue to be for multiple violations. Many amateurs who are given the opportunity of a second chance are often "picked up" again for repeated misconduct on the air.

One recent item mentioned was an amateur who violated seven separate sections of the Commissions regulations as well as openly refusing to cooperate with Commission employees in reviewing his case. It took a number of pages to enumerate the violations incurred by this particular amateur and after considerable time, and much cost on the part of the Commission, the amateur received a meager one-year suspension.

It is high time we reevaluate our on-the-air operating practices! It is about time we stopped fighting with our League-appointed Official Observers! It's time to close ranks, show the Commission, and our country we are a group of dedicated technicians, always at their fingertips, ready to assume public service; and then, *do it!*

While a great amount of criticism has been generated lately toward this business of certificates, we can't help but wonder that this may be the ideal media with which to start educating our state and local officials. By far the most successful certificates have been those illustrating historical and educational facts about the community. Radio clubs too, can take a greater part in community activities—fund drives, traffic control, *etc.* How many clubs send their town officials a copy of their club bulletin? For that matter, how many club bulletins are written intelligently enough for "outsiders" to read? Not enough, we think.

Let's keep in mind Mr. Kolsky's warning that radio amateurs are "not immune" to the growing competition for frequency-allocations facing this country.

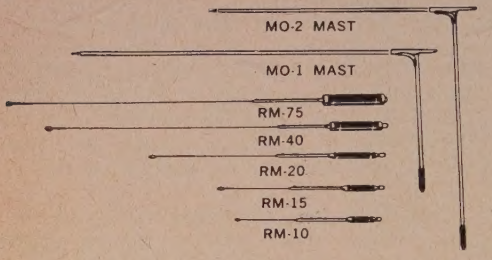
OUR COVER

ZE5JJ's v.h.f. array is pointing at INJUN I. Working with the world renowned Dr. Van Allan, Pete has put together a satellite tracking and monitoring station that would be the envy of any amateur. See page 43 of this issue for details.

GOOD MOBILES GO

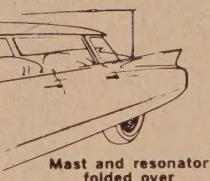
HUSTLER

MOBILE ANTENNA
10-15-20-40-75- METERS



Buy only the mast and resonators for the bands you operate. NO NEED FOR MATCHING DEVICES, NO FEED LINE LENGTH PROBLEMS. Use any length of 52 ohm cable. New, efficient concept of center loading. Each resonator has a coil specially designed for maximum radiation for a particular band. Center frequency tuning is by an adjustable stainless rod in the resonator. The fold-over aluminum mast permits instant interchange of resonators. Mast folds over for garage storage. Mast has 3/8-24 base stud to fit standard mobile mounts, but will perform better with New-Tronic mounts. Power rating is 75 watts dc input A.M. - 250 watts PEP input for SSB.

Mast and resonator in mobiling position



Mast and resonator folded over

RESONATOR WILL WORK PROPERLY ONLY IF USED WITH MO-1 OR MO-2 MASTS. ANTENNA ASSEMBLY CONSISTS OF 1 MAST and 1 RESONATOR.

MODEL	DESCRIPTION	TOT. HGT. of ASSY.	NET
MO-1	54" mast folds at 15" fr. base	Rear deck or fender	$ 7.95
MO-2	54" mast folds at 27" fr. base	Bumper	7.95
RM-10	10 meter resonator	80" max. - 75" min.	5.95
RM-15	15 meter resonator	81" max. - 76" min.	6.95
RM-20	20 meter resonator	83" max. - 78" min.	7.95
RM-40	40 meter resonator	92" max. - 87" min.	9.95
RM-75	75 meter resonator	97" max. - 91" min.	11.95

ANY MAST OR RESONATOR MAY BE PURCHASED SEPARATELY

MODEL BM-1 BUMPER MOUNT

Flat alloy steel strap fits any shape bumper, large or small. "J" bolts require only 1/4" clearance between top of bumper and car body. Heavily chrome plated 1 1/2" die cast Zamak ball has 3/8"-24 thread. Adjustable for true vertical position. Gray Cycolac base. Heavily cadmium plated....$6.95

Ask your distributor to show you these and other fine NEW-TRONICS products. Write for literature on the complete NEW-TRONICS line.

NEW-TRONICS CORP.
3455 Vega Avenue Cleveland 13, Ohio

For further information, check number 7, on page 110

Letters..... to the Editor

The S.W.L.

Editor *CQ:*

The correspondence from Short-wave listeners published in the May and August issues of *CQ* has me puzzled.

These short-wave listeners complain at being left out in the cold by both the transmitting amateur and the ARRL—because they are s.w.l.s.

Then, I say, why remain a short-wave listener?

Anyone with the normal amount of "grey-matter" could master Morse to 5 w.p.m. and sufficient theory to become a Novice—*If they really want to!*

No, I am forced to the conclusion that the short-wave listeners like so many people today, want things made easier and easier for them.

Buy yourself a *Handbook*, Mr. S.W.L., get to work learning the code and, with your Novice license, both the ARRL and your fellow amateurs will welcome you as a fully-fledged member of the amateur radio fraternity.

F. Allan Herridge, G3IDC
96, George St.
Basingstoke
Hampshire, England

Editor *CQ:*

I have read with interest the discussion of s.w.l.in in recent issues of *CQ*, and should be grateful for the opportunity to make a few comments. While approving of the general trend of the discussion, I feel that neither editorial staff nor ham readers (nor, for that matter, some of your correspondents who call themselves s.w.l.s) are familiar with the world of s.w.l.in as they ought to be.

In the first place, s.w.l. is a misnomer. "Monitor" is a more acceptable and more comprehensive term. If this term is used, several major branches of the art can immediately be defined, and are all distinguished and given due space in a publication like the Newark New Radio Club *Bulletin, viz:* (1) l.w. or v.l.f. monitoring; (2) b.c.b. or m.w. monitoring; (3) s.w.x.a. (short wave except amateur) monitoring (mainly broadcast stations); (4) The monitoring of Utilities; (5) f.m. monitoring; (6) TV monitoring; (7) s.w.l. monitoring (the monitoring of amateur bands). Hams tend to place all monitors in (7). In fact, only a minority of monitors listen at all regularly on the amateur bands. Most of us, including myself, find other kinds of listening more interesting and rewarding (I am sorry if I offend the *amour Propre* of hams by a statement of this kind, but it happens to be true).

Many amateurs seem to believe that the monitor is a kind of subspecies of ham—much inferior sub-species, naturally—and that monitors as a class are simply too lazy, too stupid or too casually interested in radio to obtain a license to transmit. I am afraid that these beliefs are illusions. For one thing, the vast majority of monitors could obtain ham licenses with very little effort; the intellectual requirements are very modest and, as has often been demonstrated, can be met with ease by children not yet out of junior high school (I except the Extra from this judgment). For another, monitoring, although it has certain associations and some community of interest with ham radio, has become a separate hobby, with its own loyalties and enthusiasms. Whatever may have been the case in earlier days, the skilled monitor does not now regard his activities as necessarily inferior to those of the ham.

Are You Fully Qualified For An Unlimited Career In Electronics?

What's your answer? Do you know *enough* about electronics to take advantage of the tremendous opportunities in the world's fastest growing industry? If there's *any* doubt in your mind, consider this:

It takes more than desire or the "breaks" to get the top jobs in electronics. The primary requirement is a thorough understanding of advanced electronic theory and math plus the ability to apply this knowledge in such exciting fields as Computers . . . Servomechanisms . . . Magnetic Amplifiers . . . AC Circuit Analysis . . . Pulse Circuitry . . . Radar . . . Advanced Measuring Techniques . . . Industrial Electronics . . . Instrumentation . . . Automation . . . Radio Telemetry . . . Semiconductors. Cleveland Institute Home Study can provide this knowledge and combined with your natural desire to get ahead, will let you make your own breaks . . . get the high paid, more challenging jobs that are available right now to men who are fully qualified.

CIE's Exclusive Guarantee of Electronics Training Effectiveness . . . A Commercial FCC License or Your Money Back

Many schools offer home study electronics training. But of all of these, you'll find only one . . . Cleveland Institute of Electronics . . . makes this exclusive guarantee:

Completion of our Master Course (both sections) prepares you for an FCC First Class Commercial Radio Telephone License with a Radar Endorsement. If you fail the FCC examination for this license after successfully completing the Master Course, you will receive a full refund of all tuition payments. This guarantee is valid for the entire duration of your enrollment period.

Cleveland Institute of Electronics

1776 E. 17th St., Desk CQ-93
Cleveland 14, Ohio

Accredited by the National Home Study Council

Three More Ways In Which CIE Helps Its Students Get Ahead In Electronics

Once you've enrolled with Cleveland Institute, you automatically get these important "extras" . . . *free:*

Job Service . . . every month, throughout your training, CIE will supply you with a listing of hundreds of job opportunities. High paying, interesting jobs . . . with top companies throughout the world. See how CIE training opens a whole new world in electronics opportunity.

Electron Bulletin . . . every month, every student receives a free copy of this informative bulletin that will keep you up to date on what's going on in the world of electronics.

And, for when you graduate —
PLACEMENT ASSISTANCE . . .

For every graduate, we will prepare and print 200 letters of recommendation and 200 resumés of your qualifications. As hundreds of our graduates can tell you, this valuable service lets you take immediate advantage of your new skill and knowledge and begin your trip to the top in electronics.

This free booklet will give you complete details on Cleveland Institute Home Study Training and how it can qualify you for an *unlimited* future in electronics. Don't miss this opportunity. Send the coupon *today*.

Get This Handy Pocket Electronics Data Guide Free...

Conversion factors, formulas, tables and color codes at your fingertips. Yours without obligation, simply for responding NOW to this opportunity to improve your future.

I want to know more about your electronics home study training program. Please send me your free booklet described above plus your handy pocket Electronics Data Guide. I understand there is no obligation. I have had training or experience in electronics as indicated.

Clip Here and Mail Coupon To

Cleveland Institute of Electronics
1776 E. 17th St., Desk CQ-93 Cleveland 14, Ohio

- ☐ Military
- ☐ Radio-TV Servicing
- ☐ Manufacturing
- ☐ Communications
- ☐ Amateur Radio
- ☐ Broadcasting
- ☐ Home Experimenting
- ☐ Other

I'm now working in_____

I want to know about the following branches of electronics_____

(please print)

Name_____ Age_____

Address_____

City_____ Zone_____ State_____ CQ-93

—RETURNS HOME.
PORT O'CONNOR, TEX.,
SEPT. 13
Destructive hurricane Carla swept inland practically leveling this community.
(AP WIRE PHOTO)

a friend in need . . . the reliability of the

ASTATIC
331
CERAMIC MICROPHONE

instantly in touch, clearly heard, completely intelligible, helping to create order out of chaos. The unfailing communications "mike" that delivers dependable performance under crisis conditions. Even when the demands are substantially less extreme — for 27 megacycle citizens' band and paging — the Astatic #331 Ceramic Microphone does yeoman service. With momentary-on, spring-return switch and hang-up bracket for assured service under mobile conditions. Top quality with value to match.

LIST PRICE $17.90

OTHER ASTATIC MICROPHONES IN THE QUALITY 330 SERIES:

- *Dynamic Models 335H (high impedance) and 335L (low impedance) for superior performance in TV, radio, professional or home recording, public address with equal effect with lavalier, hand or stand applications.*
- *Ceramic Model 333 is a wide range instrument for performance perfection in tape recording, P.A. systems, etc.*
- *Crystal Model 332, outstandingly versatile.*

Write for ASTATIC Data Bulletin #330
THE ASTATIC CORP.
CONNEAUT, OHIO • U.S.A.
IN CANADA: Canadian Astatic Ltd., Toronto
EXPORT: Roburn Agencies, N. Y. 13, N. Y.
MANUFACTURERS OF
PHONOGRAPH CARTRIDGES • NEEDLES
PICKUPS • MICROPHONES • RECORDING TAPE

For further information, check number 8, on page 110

Anyone who imagines that monitoring is too simp an activity to qualify as an absorbing hobby shou give it a trial. If, by the end of six months, he h heard Outer Mongolia and South Africa on b.c. and the Falkland Islands on s.w.b.c., I shall conce weaknesses in my arguments. By that time, howev he will probably find it difficult to break the spe . . . At last count one well-known American monit had verified 143 countries in the range 535 to 16 kc—to my mind an infinitely more difficult feat tha qualifying for DXCC. Another has verified more tha 40 countries between 10 and 535 kc.

There are three flourishing major clubs in Nor America that cater to the interests of monitors, an publish regular bulletins. These are: The Newa News Radio Club, 215 Market St., Newark, N.J.; TH National Radio Club, Box 63, Kensington, Statio Buffalo 15, N.Y.; and The American Short Wa Listeners Club, 46C Parkway Village, Cranford, N.J. The oldest and largest is the NNRC, and any reade of *CQ* to whom the idea of monitoring sounds a pealing would be well advised to write to their addres Monitoring is also popular in other countries, notab Sweden, Great Britain and New Zealand.

My judgment is that the superciliousness whic hams and amateur radio organizations too often di play towards monitors is thoughtless, unjustified, an out of line with events. There is no reason why th two groups of hobbyists should not work together a spirit of friendly equality. For myself, I have considerable respect for hams; but this respect do not amount to adulation nor do I feel overcome wi humility in any association I have with them.

Mr. John Macdona
University of Alber
Edmonton, Alberta
Canada

Hm! Hm! Good

Editor, *CQ*:

Your HAM CLINIC strikes me as one of your be departments. Keep up the good work. —*W4FD*

Editor, *CQ*:

Just a "vote" to let you know how much I enj HAM CLINIC. —*K6C*

We agree.—*Ed.*

Payment In Full

Editor, *CQ*:

I am the boy who asked *CQ* readers for "Mo Good Will" in March '62, page 16. Up until today have received many books from many amateurs all ov the United States. These books will be valued f a long time by our members. I must thank *CQ* reade and you for their kindness.

Hirokuni Asada, Member, JA1YA
32b Funabaschicho
Setagaya
Tokyo, Japan

Patching Again

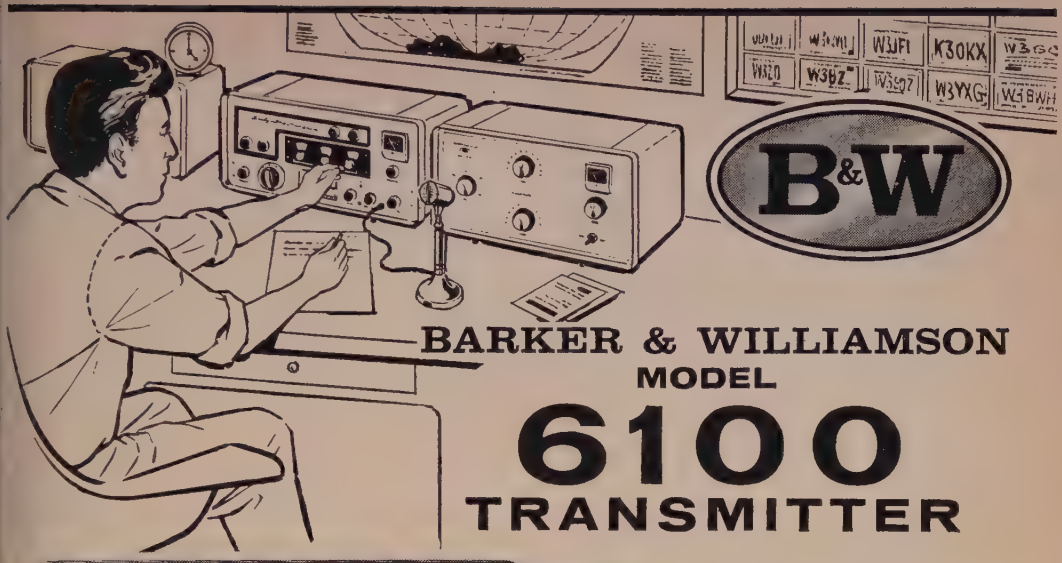
Editor, *CQ*:

W9YMZ, in his letter, (September, *CQ*) did a excellent part job presenting a few legal and technic justifications for continued phone patching by W/ stations. However, he, as he accused ARRL, also stick his head in the sand. He also ignores the scope present abuses, both legal and technical, together wi the mass QRM, rammed down the throats of all oth nations in the world.

Obviously FCC chooses to ignore much of the leg aspects, unless issues are made, or they just happe onto a violation. One does not have to be too intel gent in monitoring much of overseas phone-pat traffic to recognize business arrangements in progre

A factor Kermit refuses to recognize also is th the U.S. is just one nation among many and especial so at international conference tables discussing fr quency allocation, use, and yes, *abuse*.

The U.S. has reciprocal traffic treaties with a fe nations confined almost exclusively to Central a South America. A large percentage of so-called amate traffic between the U.S. and these countries involv business transactions . . . even use of business codes.



BARKER & WILLIAMSON
MODEL
6100
TRANSMITTER

SSB - CW - AM

With the

ALL NEW

CRYSTAL CONTROLLED

FREQUENCY

SYNTHESIZER

MODEL
LPA-1

GROUNDED GRID 1 KW LINEAR AMPLIFIER

The B&W LPA-1 Grounded Grid Linear Amplifier is the ideal companion high powered final for Model 6100. The LPA-1 produces a signal of extremely low distortion because of a unique negative feed-back arrangement.

MODEL 6100 - *A NEW STANDARD OF FREQUENCY STABILITY*

Engineered and built for outstanding performance and lasting satisfaction. The B&W 6100 is unsurpassed in stability, sideband suppression, signal quality, talk-power and many other features.

It is the first SSB amateur transmitter employing a crystal frequency synthesizer.

Send for colorful, descriptive brochure.

BARKER & WILLIAMSON, Inc.

Radio Communication Equipment Since 1932

BRISTOL, PENNSYLVANIA • STillwell 8-5581

For further information, check number 9, on page 110

Designed for

Application

THE NO. 90932 MODULATION MONITOR

The No. 90932 Amateur Band Monitor Oscilloscope is a complete oscilloscope for monitoring the modulated r-f output of a transmitter. Built-in link-coupled tuned circuits cover all amateur bands 3.5 to 54 mc. All circuits and accessories are built in. The monitor will display the r-f envelope and/or the trapezoidal monitoring pattern of single side band transmitters or amplitude modulated transmitters. It shows the linearity or non-linearity of Class-B r-f amplifiers, parasitic oscillation, neutralization, and r-f output.

JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY

MALDEN

MASSACHUSETTS

The great majority of nations of the world not only do not agree with the wholesale phone-patch abuse by the U.S. amateurs, they deeply resent it. The U.S. abuses have now grown to such scope of unwarranted QRM by the "clear channel" boys, that the U.S. is headed for some rough treatment at the next international showdown. To say "we" don't deserve it is being naive.

I feel it high time phone patching, except for emergencies, sickness, death and possibly travel data, be made illegal under the law. Military folks should use their MARS facilities for their semi-military traffic. If it were not for the military's attitude in handling phone patches, we'd say hamdom should police itself in this matter.

Have you ever attempted to get one of these semi-military 24-hour a day, phone-patch stations to share a frequency?

ARRL has proven that they are engaged in a power struggle to dominate world-wide hamdom. Creation of goodwill amongst nations does not appear to be manifested in their policies. The solution, we suggest, lies in action by the Congress.

Clif Evans, Jr., K6BX
Bonita, California

Memories

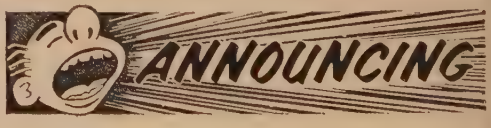
Editor, *CQ:*

This letter is the direct results of W4TDT's story of KG1CC (CQ, July, pg. 55) and it is hoped that it will be published as a way of saying "thanks" to the hundreds of amateurs who helped me during my tour of duty as "Chop" KL7FBK/AK1FBK. Through his article, Luther helped to bring back fond memories of my own days in the far north.

For your information KL7FBK (Galena Air Force Station) is located approximately 300 miles Northwest of Anchorage and 250 miles West of Fairbanks, on the banks of the famed Yukon River. During my stay the ole mercury managed to plunge to –63° and remained there for ten days! Naturally, morale was a prime consideration and it was to this end I had the privilege of operating three complete positions simultaneously for twelve to fifteen hours daily for a year.

To sit here and attempt to name all calls involved would be impossible, as hundreds of regulars flit through my mind. All I can say is, thanks to all who helped me set a new traffic record and made my year in the "Land Of The Midnight Sun" unforgettable despite the many hardships.

A/2c Keith D. Collins, K1BTD, ex-op KL7FBK
1608th Ops Sqdrn.
Box 194, Charleston, AFB, S.C.



Lenoir County, N.C.

Received too late for inclusion in the regular USA-CA Column this month, is an announcement that the Kingston A.R.S. will celebrate their Bicentennial by continuously operating a station on all bands during the four weekends in October. Commemorative QSLs will be sent and a few of the calls that will be active are: W4OIX, K4DQP, IGJ, PLF, POR, PRJ, TBP, WA4BFF and WA4EAH.

San Francisco

Five participating clubs in the San Francisco Greater Bay Area will hold their Hamfest Oct. 7th at the Hilton Inn at Frisco's International Airport. Prizes, Hunts, Swaps, Speakers, Displays, etc., are all expected. Six-fifty covers all (including dinner, tax *and* tip.) Tickets are available from the Greater Bay Area Hamfest, P. O. Box 113, Hayward, California.

←For further information, check number 10, on page 110

YOUR DREAM ANTENNA FOR 10-15-20-40 METERS WITH A PLANNED BUDGET

1

MODEL TA-31

Start today with the purchase of the inexpensive Model TA-31, and in three additional steps you can have the famous MOSLEY TA-33 TRAPMASTER BEAM plus the New TA-40K to add 40 Meters.

Amateur Net $25.85

+ Mosley TA-31/32 Conversion Kit

NEXT purchase the Kit to convert the TA-31 to a TA-32. Kit consists of reflector element, seven foot boom and all necessary hardware.

Amateur Net $43.65

2

MODEL TA-32

This extra element gives your Antenna additional gain and directivity over the single rotatable dipole.

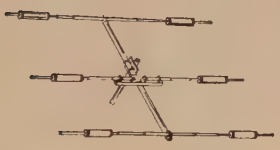
Amateur Net $69.50

+ Mosley TA-32/33 Conversion Kit

For your third step to outstanding performance, purchase the kit to convert the TA-32 to a TA-33. This includes a director element, seven foot boom, boom splice and all necessary hardware.

Amateur Net $30.25

3



MODEL TA-33

This is model TA-33 MOSLEY TRAPMASTER famous world wide for mechanical construction quality and performance. *(for 10, 15 and 20 meter bands)*

Amateur Net $99.75

+ Mosley TA-40K Conversion Kit

Finally, you can add 40 meters to your TA-33 without affecting the characteristics of the TA-33. Kit contains all necessary hardware. WITH THE 11-YEAR SUN-SPOT CYCLE in effect, 40 meter operation becomes more important than ever.

Amateur Net $39.95

4

MODEL TA-3340

NEW!

MOSLEY TA 3340 TRAPMASTER is now available as a complete package ready to install. Package contains TA-33 and TA-40K complete with all parts and hardware.

Amateur Net $139.70

ALL MOSLEY ANTENNAS CONSTRUCTED OF:

- *6061T6 Heavy Gauge Aluminum!*
- *100% Rust/Corrosion Proof!*
- *High Grade S. Steel Hardware!*

NOTE: A Model AK-60 Mast Plate Adapter for 2" OD Mast is available. Complete with aluminum angle and hardware.

Amateur Net . . . . $ 4.78

SEE YOUR DEALER TODAY OR WRITE

Mosley Electronics Inc.

4610 N. LINDBERGH BLVD. - BRIDGETON, MISSOURI

For further information, check number 11, on page 110

Amateur/CB/ or industrial —
You can't go wrong with HORNET.

Model TB 1000-4
Cash Price $112.50
Only $10.50 per month

Model TB 1000
Cash Price $89.75
Only $8.35 per month

Co-Axial Antenna for CB.
Model CO-CBI
Price $34.50

Model TB 750
Cash Price $67.50
Only $6.30 per month

Model TB 500
Cash Price $55.95
Only $5.20 per month

Stacked Co-Axial Antennas.
108 to 470 MC
Write for Price.

MAIL YOUR ORDER TODAY

HORNET ANTENNA PRODUCTS CO., INC.
BOX 808, DUNCAN, OKLAHOMA

Please rush the Hornet Antenna indicated below for a 10-day trial. If not satisfied, I agree to return the antenna prepaid within 10 days without obligation.

☐ I prefer shipment to be c.o.d. 25% is inclosed.
☐ Payment in full is inclosed.
☐ I wish to use your Time Payment Plan.

Model	Description	Price

Name_____ Call Letters_____
Address_____
City_____ State_____

SATISFACTION GUARANTEED

For further information, check number 10, on page 110

Attention Mormons

KØRYW, Garth Stonehocher is compiling a Directo of radio amateurs who also are members of the Chur of Jesus Christ of Latter Day Saints. Garth's addr is 605 So. 4th St., Boulder, Colorado.

Rock Hill, S.C.

The Rock Hill Amateur Radio Club's annual hamfe is scheduled for October 14th, at Jaslin Park, Roc Hill, South Carolina. Bill Jennings, W4UNP is charge of paper work and will appreciate your respon via P.O. Box 90, Rock Hill, S.C.

Oklahoma

The 3rd Annual Oklahoma State Radio Amate Convention to be held at Lake Texoma Lodge depar slightly from the usual. Three dollars covers both da Oct. 27-28 and banquets and dancing are specifica omitted. Plenty of entertainment is promised thou and pre-registration closes Oct. 15. W5FMX is ha dling convention lodgings. P. O. Box 7169, Oklaho City, Oklahoma, is the headquarters address.

"Twentieth Century"

Although not of a radio amateur nature, a rece publicity release that crossed our desk may be enou to keep your club members active this season. Seven five half-hour 16 mm films of the *Twentieth Centu* series are being made available to clubs on a free-lo basis by the Prudential Insurance Company of Ame ica. This series is narrated by Walter Cronkite a produced for the Public Affairs Dept. of CBS New The club program chairmen are asked to contact th local Prudential Agent, the company's headquarters Newark, N.J. or Association Films, 347 Madison Av New York 17, New York. A listing of subjects m be obtained free.

Indiana

The Hoosier Hills Ham Club, Inc. will hold the first annual Hamfest on Oct. 14th, at Spring Mill Sta Park, on Highway 60 east of Mitchell, Indiana. K9BE will fill you in on the incidentals.

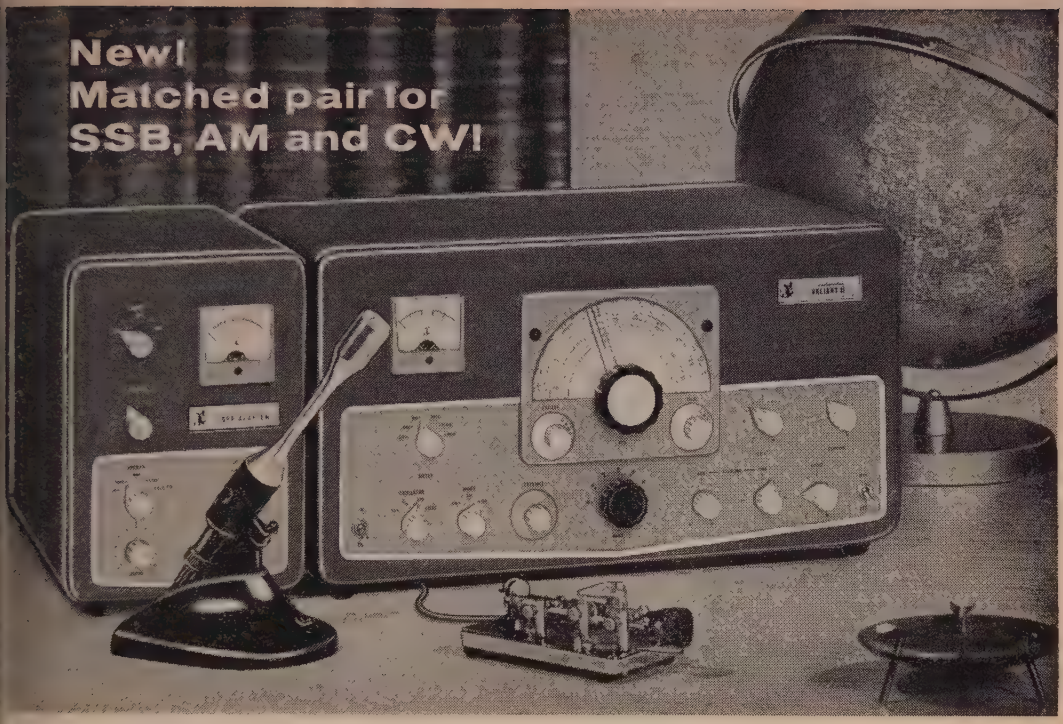
1913 Radio Amateurs

After an initial list of radio amateurs compiled W1NP appeared in *CQ* for April, pp 16-17, Bill Gou received the additional names shown below. All t gentlemen originally appeared in the 1913 issue the Dept. of Commerce *Call Book*.

Present Call		*1913 Cc*
W1ATS	A. Ralph Tabbut	1AK
K2BF	William N. Baker	2LU
W2IY	Edward W. Dugan	2IY
W2WL	Willace H. Leland	6WL
W3PW	Joseph C. Van Horn	3CM
W4VG	Stanley G. Saulnier	2KT
W6AG	Gale H. Johnson	7GY
W6BG	William G. Gerlach	6GE
W6CK	Forrest I. Phippeny	8CX
K6DG	Knox W. Nicholson	6KN
WA6FLB	DeForest Mocker	6AV
K6FK	Charles A. Max	6MA
W6GW	Howard A. Cookson	6DI
W6JE	Herbert C. Grundell	6DP
W6KHR	Alfred S. Dewald	6DW
W6VF	Louis G. Giannini	6LG

Sigma Alpha Epsilon

Stan Head, is compiling a list of amateurs who a members of the above fraternity. He's looking f college, date of graduation, present address and am teur activity. Stan's call is K8MMZ and the QTH 4383 Keeler Drive, Columbus 27, Ohio.



Outstanding performance on SSB, AM and CW with absolutely no compromise on any mode!

"SSB ADAPTER"—Here's the filter-type SSB generator amateur operators everywhere have been asking for! Bandswitching 80 through 10 meters . . . more than 50 db sideband suppression . . . more than 45 db carrier suppression! When used with the Viking "Valiant" or "Valiant II" it places 275 watts P.E.P. at your command—gives you the punch and penetration necessary for solid communications on today's crowded bands!

Two compact units and interconnecting cables . . . RF unit is only 8" wide—may be placed on your operating desk—power supply unit may be placed in any convenient location. Unique design features built-in multiplier requiring VFO input only—band-pass interstage couplers require no tuning—design and front panel layout make operation practically "foolproof"! Superb audio fidelity and balanced audio response; excellent sideband, spurious and carrier suppression. Other features: positive VOX and anti-trip circuits with built-in anti-trip matching transformer and adjustable VOX time delay.

Cat. No. 240-305-2—Wired and tested with remote power supply, tubes crystal filter, less microphone. **AMATEUR NET** **$369.50**

"VALIANT II"—Newly restyled, the "Valiant II" gives you outstanding flexibility and performance in a compact desk-top rig! Bandswitching 160 through 10 meters—delivers a full 275 watts input CW or SSB (with auxiliary SSB exciter or the new Viking SSB Adapter) and 200 watts AM! Low level audio clipping prevents overmodulation and increases modulation level and intelligibility—differentially temperature compensated VFO provides the extreme stability necessary for peak SSB operation! High efficiency pi-network tank circuit—final tank coil is silver-plated. Other features: complete TVI suppression; timed sequence (grid block) keying; high gain push-to-talk audio system built-in low pass audio filter; self-contained power supply; and single control mode switching.

AS AN EXCITER—Drives any of the popular kilowatt level tubes, and provides a high quality speech driver system for high powered modulators.

SSB OPERATION—Provision for plug-in SSB operation with no internal modification necessary. Rear panel fittings provided for VFO output and SSB input, connections for remote control of final amplifier bias and VFO keying through the VOX control of the SSB adapter.

Cat. No. 240-105-1—Kit with tubes, less crystals. . . . . **AMATEUR NET** **$375.00**

Cat. No. 240-105-2—Wired and tested with tubes, less crystals. . **Amateur Net $495.00**

New Catalog

E. F. Johnson Co. also manufactures other transmitters and accessories . . . all described in our newest amateur catalog. Write for your copy today!

E. F. JOHNSON COMPANY
WASECA, MINNESOTA, U.S.A.
®

FACTORY AUTHORIZED SERVICE Instead of shipping to our factory, equipment to be serviced may also be sent to:

Electrosony Corp.—Empire State Div.
65-37 Queens Blvd.
Woodside 77, New York

Park-Armature Co.
1218 Columbus Ave.
Boston 20, Mass.

Heights Electronics, Inc.
1145 Halsted Street
Chicago Heights, Ill.

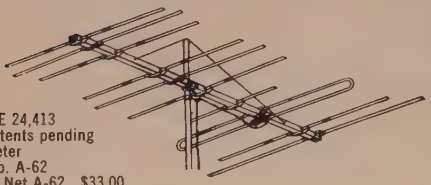
B and S Electronics, Inc.
6326 W. Roosevelt Rd.
Oak Park, Ill.

Radio Comm and Engr.
Pinehurst Place
Charlotte 9, N. C.

For further information, check number 13, on page 110

NOW!
TWO ANTENNAS IN ONE*

*another *FIRST* from *FINCO*



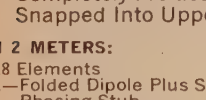
Patent RE 24,413
Other patents pending
6 & 2 Meter
Model No. A-62
Amateur Net A-62 $33.00
Stacking Kit AS-62 $2.19

The Only Single Feed Line
6 & 2 METER
COMBINATION YAGI ANTENNA
from FINCO

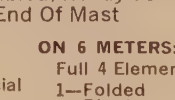
- Heavy Duty Square Aluminum Boom, 10 Ft. Long
- All Elements are Sleeve Reinforced And Completely Pre-assembled With "Snap-Out" Lock-Tite Brackets
- Boom Suspension Rods Are Supplied Completely Pre-assembled, Ready To Be Snapped Into Upper End Of Mast

ON 2 METERS:
18 Elements
1—Folded Dipole Plus Special Phasing Stub
1—3 Element Collinear Reflector
4—3 Element Collinear Directors

ON 6 METERS:
Full 4 Elements
1—Folded Dipole
1—Reflector
2—Directors



A6-4 6 Meter 4 Element
Amateur Net $17.16
Stacking Kit AS-6 $2.19



A2-10 2 Meter 10 Element
Amateur Net $11.88
Stacking Kit AS-2 $1.83

A1¼-10 1¼ Meter 10 Element
Amateur Net $11.88
Stacking Kit AS-1¼ $1.26

See Your FINCO Distributor
or write for Catalog 20-226 to:
THE FINNEY COMPANY
Dept. 19, 34 W. Interstate St., Bedford, Ohio

For further information, check number 14, on page 110

Navy MARS

Rear Admiral Bernard F. Roeder, Director of Navy Communications announced during his speech at the ARRL National Convention that the Navy will begin a MARS program similar to that now in existence for the Army and Air Force. Target date has been set for January 1, 1963. The major change in format will be the issuance of different call signs from that now already assigned to Army and Air Force. Amateurs will receive *only* NØ calls. The specific block being NØRAA to NØZZZ. An amateur in California and an amateur in Maine may then possibly receive NØRAA and NØRAB respectively. Lt. Cmdr, C. R. Winnette, now head of the Naval Reserves and Amateur Radio Liaison Branch of the Office of Naval Communications will head Navy MARS.

Stolen

Ed Deady, K5TFL tells us his Gonset G66 (#705) and G77 (#612) have been stolen, along with a Gonset power supply (#PO1097). Minor modifications were made to the equipment. Ed's QTH is 3621 Brynmawr, Dallas 25, Texas. Phone: EMERSON 1-6191.

Leroy Schmidt, K2HNS, 10 Oak Lane, Wayne, N.J. had a Johnson Mobile transmitter (#NC50170) and Viking Mobile v.f.o. stolen from his mobile installation, and is offering a $25.00 reward for information leading to its recovery.

Hudson Division

The Hudson Amateur Radio Council, Inc. (HARC) will sponsor its Division Convention on October 12-13 at the Statler-Hilton Hotel in New York City. Theme of the Convention will be the 50th Anniversary of amateur licensing by the Federal Government. Highlighting the banquet will be a speech by Herb Hoover, Jr., W6ZH newly elected President of the ARRL. Tickets are $11.00 in advance and $12.00 at the door for all events including the banquet. Tickets at $2.00 will entitle the amateur to all activities, less the banquet. More informaion can be obtained from HARC, P.O. Box 36, Huntington, L.I.

Cleveland Amateuradio

The Sheraton-Cleveland Hotel on Cleveland's beautiful public square will play host to the 1962 Clevelandia Amateur Radio Convention beginning at 7 P.M. October 12th and concluding with the Grand Banquet at 7 P.M. October 13th. G. Merritt Preston Chief of Pre-Flight Operations, NASA Manned Spacecraft Center Cape Canaveral will be the featured speaker at the Banquet. Tickets at $2.00, and $5.00 for the Banquet may be obtained from the Convention Chairman at Box 5167, Cleveland 1, Ohio.

Correction

Please change the plate of the 5763 of the "Lil One," page 50 for July, to pin #1. Quite a few readers caught that one. Sorry!

IT IS unlikely that the Reciprocal Licensing Bill, S-2361 will be brought up for discussion by the Interstate and Foreign Commerce Committee before this session of Congress adjourns. In that case, the S-2361 will then have to be reintroduced during the 88th session of Congress, convening next January.

Please do all you can do to persuade the members of the Committee and your Congressman that there is a great deal to gain by the passage of this Bill. See October, 1961 *CQ*, pg. 7.

WIN A COLLINS 75S-3 RECEIVER WORTH $680.00 ONE DAY—OCT. 20

WRL COLLINS SPECTACULAR

Collins means quality . . . and it's easy to own if you buy from WRL. October 20th is super trade-in day on Collins Equipment. Fantastic trade allowances. Pack your gear... trade it on the following Collins rigs.

Collins KWM2 SSB Transceiver . . .	$1,150.00
Nothing Down	$50.00 per mo.
Collins 75S3 SSB Receiver	680.00
Nothing Down	$32.00 per mo.
Collins 32S3 SSB Transmitter	750.00
Nothing Down	$35.00 per mo.
Collins 30L1 SSB Linear	520.00
Nothing Down	$26.00 per mo.
Collins 62S1 VHF Transverter (6 & 2M)	895.00
Nothing Down	$40.00 per mo.

Super bargains on Collins Equipment. On October 20th there will be super special prices on the Reconditioned Collins gear listed below:

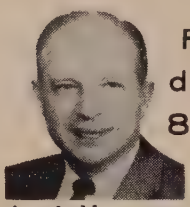
Collins 75A1 Receiver	$245.00
Collins 75A2 Receiver	299.00
Collins 75A2A Receiver	349.00
Collins 75A3 Receiver	399.00
Collins 75A4 Receiver	595.00
Collins 75S1 Receiver	379.00
Collins 32V2 Transmitter	249.00
Collins 32V3 Transmitter	349.00
Collins KWS1 Transmitter	995.00
Collins 30S1 Linear	999.00
Collins KWM1 Transceiver	449.00

IT COST LESS TO BUY COLLINS QUALITY

FREE

75S-3 RECEIVER

Win the fabulous 75S-3 by registering in person at WRL on Oct. 20. Register by mail (send coupon below with an order for any Collins Equipment between Aug. 20 & Oct. 19, 1962.



Leo I. Meyerson
WØGFQ

Remember the date Oct. 20th, 8 P.M. to 4 P.M.

"Come in and have an "Eyeball QSO" with me. We're giving away, FREE, a COLLINS 75S-3 Receiver at our One Day, WRL COLLINS Spectacular Open House. Everyone is eligible... everyone is invited. COLLINS Equipment on display and operated by factory representatives. Be my guest October 20th — refreshments and a big auction starting at 1:30 P.M.

TERMS — TRADES — PERSONAL SERVICE

- Personal Service
- Quality Merchandise
- Liberal Terms
- Our own financing
- All equipment guaranteed
- New guarantee on used equipment with 100% trade back allowance
- Over 1000 pieces of used equipment

26 Years of Serving the Amateur from The House The Hams Built.

The World's Largest Distributor of Amateur Radio Equipment

WRL WORLD RADIO LABORATORIES, Inc.
3415 W. B'dway • Council Bluffs, Ia.

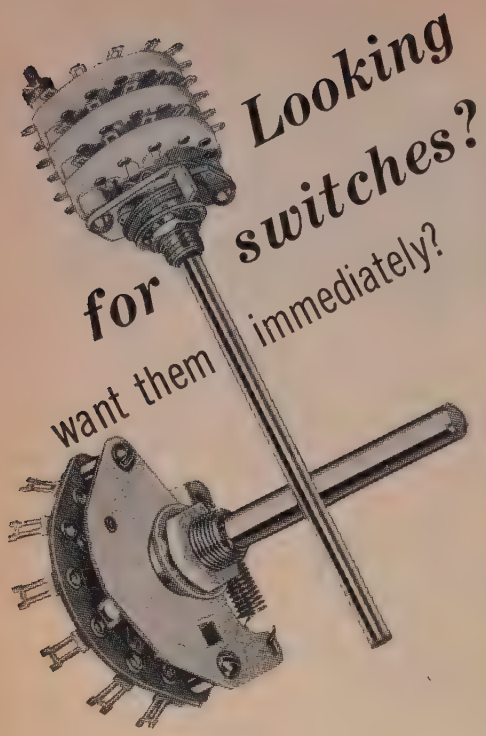
LEO: I am interested in the COLLINS _____. Send details on it. Quote a top trade allowance on my _____. Enclosed is my order for COLLINS Equipment to register me for the Free 75S-3. ☐ Send used list. ☐ Send info on Charg-A-Plan. ☐ Send flyer.

Name _____ Call _____

Address _____

City _____ State _____

For further information, check number 15, on page 110



Looking for switches? want them immediately?

see your Centralab distributor!

Whether you need one switch or one hundred, your best source is your nearby Centralab distributor. He has complete stocks of the complete Centralab line, ready for immediate delivery, *regardless of your quantity requirements.*

For every application in amateur radio—as well as in countless industrial uses—Centralab makes the switch you need: rotary and lever action; ceramic and phenolic; miniature, ultra-miniature, and general purpose.

They're all listed in Centralab Standard Catalog 31; be sure to write for your free copy.

P-6120

Centralab

THE ELECTRONICS DIVISION OF GLOBE-UNION INC.
954K EAST KEEFE AVENUE • MILWAUKEE 1, WISCONSIN
CENTRALAB CANADA LIMITED — AJAX, ONTARIO

For further information, check number 16, on page 110

QSL contes

LEW Konecky, WA2OVC forwarded this beautiful four-color fold-over card, hoping it might make it. Needless to say, it wins! The card measures 6½ × 7″ and is truly attractive enough for framing. Lew's name and QTH along with the info on the bottom is "Thermographed" (raised letters). We're happy to extend *CQ* to WA2OVC for one more year. By the way, if you haven't already guessed it, Lew is a commercial printer.

Seconds are taken this month by WN5CEE, who wondered if a "lowly Novice card" would qualify: K1LOX, whom you may have seen at your local Post Office; K7DAE, with a handsome silk-screened card and W5VA one of the fine signals coming from Texas way.

Mention should be made of the fine cards submitted by WA6UHV, DL5IA, K5HWO, K2KRF, K5JGV, K8QJH, VP9IOB, 4X4OC, WN4HOM and W4RLS.

NEW hy-gain DUOBANDER

for the popular 20-40 meter bands

New compact lightweight unit features Linear Decoupling Stub and Beta Match

The 20-meter and 40-meter bands are becoming more and more popular with amateurs because of more room for expansion and low sun spot activity. That's why the Hy-Gain engineering staff has designed this important new antenna. The Hy-Gain Duo-bander has three full-sized elements on 20 meters and two reduced-size elements on 40 meters. It's compact, lightweight, highly practical—and priced right.

Through the exclusive Hy-Gain development, the linear decoupling stub, the ordinarily outsize 40-meter element is reduced to about ⅔ of the normal size. This makes the Hy-Gain antenna practical, usable where others won't work out, but keeps performance standards high.

The exclusive Hy-Gain advancement of the linear decoupling stub makes two-band operation possible. You do away with inductance and capacity traps, yet the Duobander elements sections can be decoupled very efficiently. The linear loading principle, another Hy-Gain exclusive, does far better than a loading coil in reducing antenna size.

A proven Hy-Gain development—THE BETA MATCH makes possible maximum gain and low standing wave ratio into a single 52 ohm coaxial feed line. For perfect pattern symmetry, a broad band balun is an integral part of the matching system.

SPECIFICATIONS

ELECTRICAL

Forward Gain over a tuned dipole 20 meters	8.1 DB
Forward Gain over a tuned dipole 40 meters	4.9 DB
Front to back ratio 20 meters	20-30 DB
Front to back ratio 40 meters	15-20 DB
VSWR at resonance (typical)	1.2:1
Nominal impedance	50 ohms
Power Capability	5 KW P.E.P., 3 KW AM

MECHANICAL

Net Weight	54 lbs.
Boom Length	24 ft.
Element Length	Approx. 40 ft.
All aluminum construction—Alloy 6063T832—Tensile strength 45,000 PSI	
All hardware iridite-treated to military specifications; all plastic high impact Cycolac	
Wind surface area	6.9 sq. ft.
Turning Radius	24.2 ft.

price $169.50

See your local Hy-Gain dealer or write for Duobander Bulletin.

hy-gain antenna products
8405 NE HIGHWAY 6, LINCOLN, NEBRASKA

For further information, check number 17, on page 110

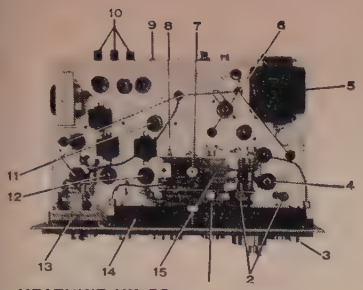
HEATHKIT HX-30 SIX METER SSB TRANSMITTER

SSB SIX PACK

A NEW EXCITER & AMPLIFIER FOR 125 WATTS PEP ON S

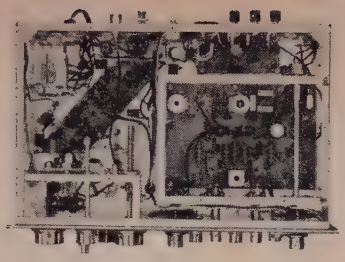
HEATHKIT® by Daystrom

HEATHKIT HA-20 SIX METER LINEAR AMPLIFIER



HEATHKIT HX-30
SIX METER SSB TRANSMITTER

1. Anti-backlash helical gear for smooth VFO tuning. **2.** Adjustable final amp. coupling and loading. **3.** Meter control with push-button over-ride to check carrier null. **4.** 6360 final amplifier for 20 watt PEP RF input. **5.** Regulated power supply. **6.** Five test-point jacks for easy alignment using panel meter. **7.** Low frequency heterodyne VFO electronics on circuit board. **8.** VFO frequency determining components mounted on "heat-sink" plate in enclosure. **9.** Accessory socket for control functions. **10.** Built-in VOX & anti-trip circuitry. **11.** Three audio stages with speech filter. **12.** Phasing type SSB generator heterodyned to output frequency. **13.** Meter indicates relative power output. **14.** Lighted slide-rule dial with 9" per megacycle of bandspread. **15.** Two crystal sockets for net or MARS operation (provides frequency coverage down to 49.8 mc).

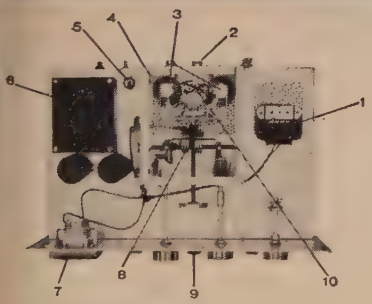


TAKES LESS THAN 30 HOURS TO ASSEMBLE: 3 extra-strength circuit boards and 3 precut, cabled wiring harnesses simplify assembly and insure correct parts placement. Compartmentalized construction and thorough shielding assure stable, reliable performance. Advanced design features provide 50 to 54 mc coverage in four 1 mc segments (crystal for 50 to 51 mc supplied); USB, LSB, CW, AM operation; 50 db carrier suppression; 40 db unwanted sideband suppressions; grid block keying with filter; 50-75 ohm coax output and many more. Overall dimensions only 16⅝" W x 10⅛" H x 10" D.

Kit HX-30, 50 lbs., no money down, $18 mo. **$189.95**

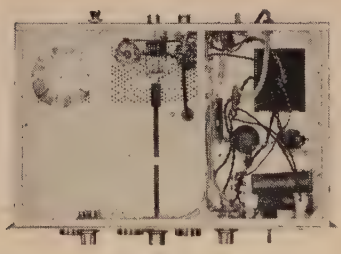
SSB SIX PACK as low as $27 per mo.

Attention all six-meter fans! Here's another Heathkit first! A brand new SSB exciter and linear for six meter operation at sensational savings! Only $289.90 for the pair . . . less than the cost of most transverters. Together they form a complete, high performance 6-meter SSB station designed for maximum efficiency and operating convenience. Check the many features of these two units . . . you'll find them the perfect pair for your station . . . enter your order today and go SSB on Six!



HEATHKIT HA-20
SIX METER LINEAR AMPLIFIER

1. Fan forced-air cooling of final amplifier. **2.** Only 2.5 to 10 watts PEP driving power required. **3.** 125 watts PEP input. **4.** Completely shielded RF circuitry. **5.** Regulated screen voltage. **6.** Solid-state rectifiers for cool, efficient operation. **7.** Metered grid current, plate current, plate voltage & relative power output. **8.** Link coupled RF output, 50-75 ohm coaxial. **9.** 50 ohm tuned grid input to accommodate various levels of driving power. **10.** Neutralized push-pull 6146 final amplifiers.



EASY ASSEMBLY: Clean, open circuit layout permits conventional wiring with less than 10 hours actual construction time. As in the HX-30, a heavy steel copper-clad cabinet provides strength, beauty and superior shielding, measures just 16⅝" W x 10⅛" H x 10" D. Frequency coverage is 49.8 to 54 megacycles. All power supplies are built in. A tremendous value at this low Heathkit price!

Kit HA-20, 43 lbs., no money down, $10 mo. **$99.95**

FREE 1963 HEATHKIT CATALOG
New edition — more than 100 new kits since last issue — over 250 kits in all.

HEATHKIT by Daystrom

HEATH COMPANY
Benton Harbor 12, Michigan

Please Send FREE 1963 Heathkit Catalog

Name _____

Address _____

City _____ Zone _____ State _____

For further information, check number 18, on page 110

A Combination S. W. R. Bridge And Amplifier Linearity Indicator

BY H. C. SHERROD*, W5ZG

The author presents a unique but simple device for use with a linear r.f. amplifier that indicates relative input and output power, input and output s.w.r. and amplifier linearity deviation.

An S.W.R. indicator/relative power output indicator is a useful device which is popular because of its simplicity and economy. The usual unit consists of an r.f. sampling device connected in the transmission line and a high resistance d.c. voltmeter. The sampled voltages are rectified to reveal the forward and reflected powers in the line. From this information we can determine the standing wave ratio in the usual manner and the relative power output is indicated by the forward reading.

The Linearity Measurement

It is important to realize that the forward rectified voltage varies directly with the forward r.f. power in the line. With this thought in mind, consider a linear r.f. amplifier.

Within the limits of linearity, the ratio of output power to input power is constant. If identical r.f. sampling devices are inserted in the input and output coaxial lines of such an amplifier, as shown in fig. 1, the ratio of the forward rectified voltages from the two sampling units will be constant within the limits of linearity of the amplifier. By using a zero center scale voltmeter and a comparison circuit with a potentiometer for equalizing the ratio of the forward rectified voltages from the two sampling devices, a visual indication of the linearity deviation can be obtained. The indication is derived from true dynamic conditions. Since the adjustment of the equalizing poten-

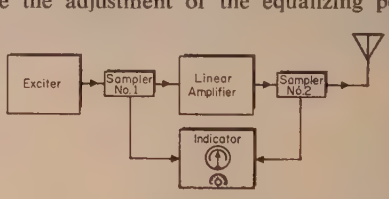


Fig. 1—Block diagram of the linearity metering setup. Two identical r.f. sampling devices are used with their outputs fed into a comparison circuit. The adjusting potentiometer is calibrated in db and indicates the gain of the linear.

*Chief, Electrical Section Design Branch, Engineering Division, U.S. Army Engineer District, Galveston, Texas.

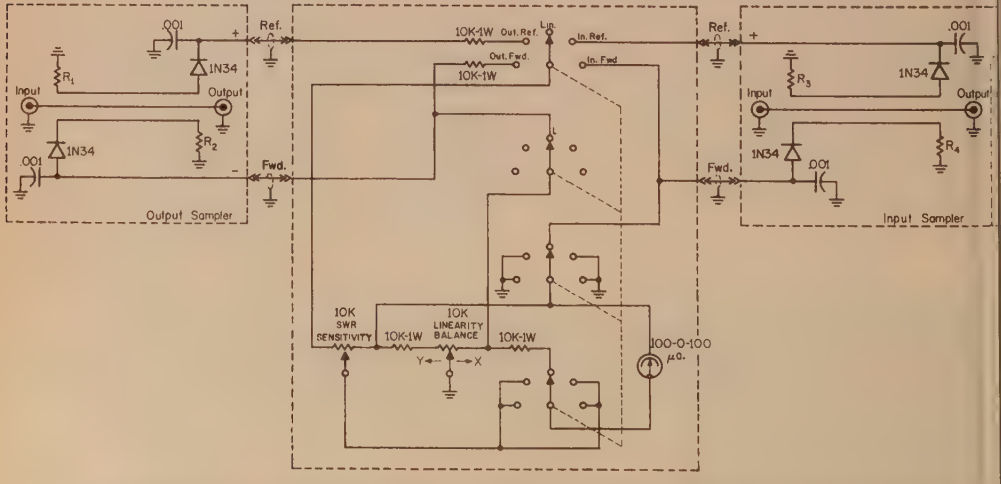


Fig. 2—Circuit of the S.W.R. Bridge/Linearity Indicator. The value of resistors R_1 to R_4 is determined by the coaxial cable impedance. For 52 ohms 175 ohm 1 watt carbon resistors are used. For 72 ohm coax the value should be approximately 240 ohms.

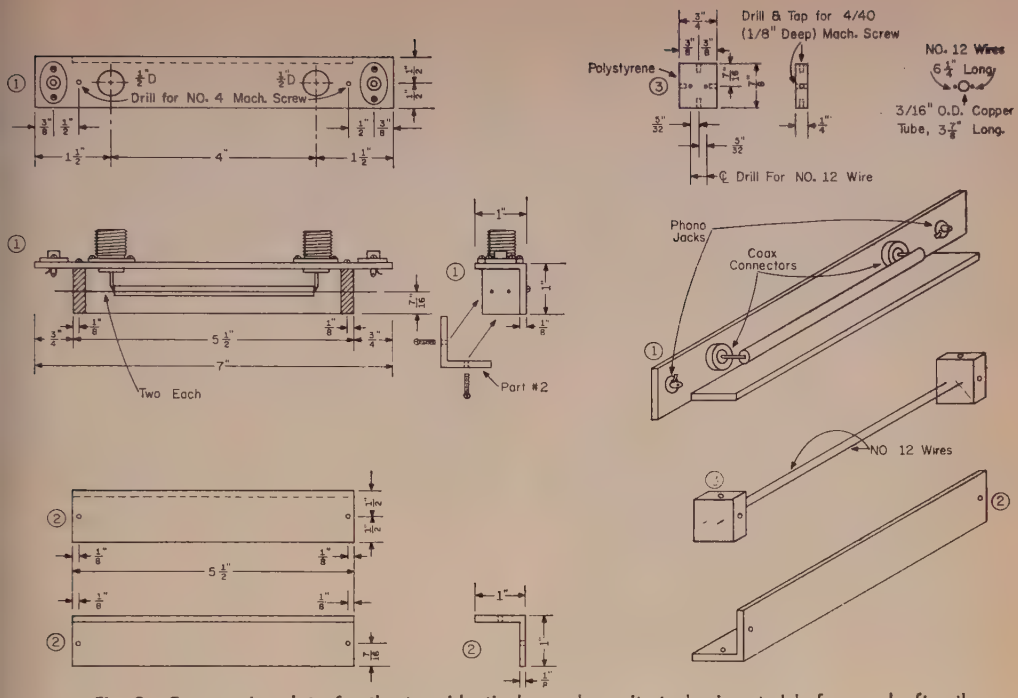


Fig. 3.—Construction data for the two identical sampler units to be inserted before and after the linear amplifier. The stock is 1/8" × 1" aluminum angle.

tiometer is a function of the power gain of the amplifier, this potentiometer can be calibrated in terms of db gain or other acceptable units.

Data for the calibration of the potentiometer in db is given in Table I and the derivation of Table I is explained at the end of this article. This potentiometer can be calibrated with a reliable ohmmeter.

As explained, two r.f. sampling devices and a zero-center meter are required to indicate linearity deviation. By incorporating a switch, an additional potentiometer and a few resistors, the meter and sampling devices can be connected to indicate the functions listed below.

Amplifier Input—Relative Forward Power.

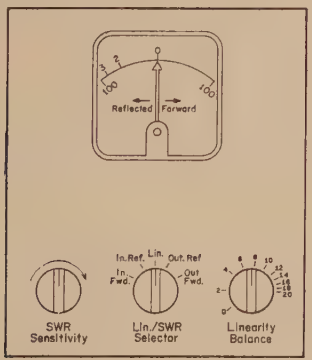


Fig. 4—Suggested panel arrangement. The s.w.r. calibration marks shown correspond as follows: An s.w.r. of 1:1 = 0μa, 2:1 = 63.5μa, 3:1 = 86.6 μa on the meter scale.

Amplifier Input—Reflected Power—S.W.R. Linearity Deviation.

Amplifier Output—Reflected Power—S.W.R.

Amplifier Output—Relative Forward Power.

Construction

The circuit of the complete unit is shown in fig. 2. The operation of the two s.w.r. bridges is conventional and is described in the handbooks. The instrument housing should be large enough to contain the two potentiometers, the five-section switch and the four 10K, 1 watt resistors. The four phono jack type connectors are located on the rear of the cabinet. Wiring is not particularly critical.

Construction data for the line samplers is shown in fig. 3. The units are made from 1" aluminum angle stock. The main conductor,

Db Gain	*X, Ohms*	*Y, Ohms*
0	10,000	0
2	8,854	1,146
4	7,738	2,262
6	6,677	3,323
8	5,695	4,305
10	4,805	5,195
12	4,015	5,985
14	3,326	6.674
16	2,736	7,264
18	2,236	7,764
20	1,818	8,182

Table I—Calibration data for the Linearity Balance potentiometer. Areas X and Y of the potentiometer are identified in fig. 2.

3/16" o.d. copper tubing, is connected to the two hot lugs of the coax connectors (in this case type C) and if the measurements are followed exactly, they will be 3⅞", center to center.

The ¼" thick polystyrene blocks support the two #12 copper wire sampling lines.

Figure 4 shows a suggested panel arrangement of the unit and a tabulation of meter readings against the standing wave ratio. A photograph of the unit is not shown since it is an integral part of the author's 1 kw linear amplifier and would show very little if any detail.

Operation

Application of this unit is explained for each function.

INPUT S.W.R.—Throw the selector switch to the INPUT FORWARD position. Apply carrier excitation to the amplifier and adjust the s.w.r. SENSITIVITY control for full scale deflection of the meter. Throw selector switch to INPUT REFLECTED position and adjust grid circuit tuning of the r.f. amplifier for minimum meter reading.

OUTPUT S.W.R.—Throw selector switch to OUTPUT FORWARD position and, with carrier, adjust s.w.r. SENSITIVITY control for full scale deflection of meter. Throw selector switch to OUTPUT REFLECTED position and read standing wave ratio of amplifier load.

LINEARITY—With full carrier inserted, and the amplifier operating under full load, throw selector switch to LINEARITY position and adjust the linearity BALANCE potentiometer for zero meter reading. Remove full carrier excitation and place amplifier in normal operating condition. If the amplifier is linear, the indicating meter will not deviate from zero during amplifier operation. When the linearity BALANCE potentiometer is adjusted as described, the potentiometer setting indicates the db gain of the amplifier.

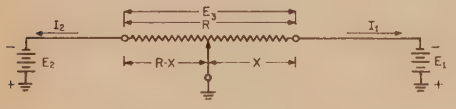
As indicated previously, in linear operation there should be no shift in the meter indication at all. In the absence of linear operation the deviation shown by the meter would vary with the amount of excitation. The shift could be caused by improper grid bias, parasitics, improper plate and/or screen voltage, improper amplifier loading or by any combination of these conditions. The operator should be concerned about any meter deflection of more than five microamperes and should in reality only settle for operation with no meter shift at all.

As a zero center scale meter was required to indicate deviation from linearity, the diode rectifiers in the two r.f. sampling devices were connected to provide d.c. voltages of opposite polarity. With this arrangement, forward power is indicated by a deflection of the meter in one direction. Reflected power is indicated by a deflection of the meter in the opposite direction. ■

Addendum

While it is not necessary for the construction of the unit, some readers may desire an understanding of the computations involved in determining the resistance points necessary to calibrate the linearity BALANCE potentiometer in terms of db of amplifier gain. The explanation is divided into two parts: first a purely theoretical analysis and secondly, the practical application.

Theoretical Analysis



R = Total potentiometer resistance in ohms.
X = Resistance of portion of pot to right of arm, in ohms.
$R-X$ = Resistance of portion of pot to left of arm, in ohms.
E_1 = Voltage across portion of pot to right of arm.
E_2 = Voltage across portion of pot to left of arm.
E_3 = Total voltage across pot.
I_1 = Current through X portion of pot
I_2 = Current through $R-X$ portion of pot.

From the above then:

$$E_1 = I_1 X$$
$$E_2 = I_2 (R - X)$$
$$E_3 = E_1 - E_2 \text{ (Note polarity)}$$

when $E_1 = E_2$, $I_1 X = I_2 (R - X)$

and

$$\frac{I_1}{I_2} = \frac{R - X}{X}$$

The ratio of voltages E_1 and E_2 can be expressed:

$$Db = 20 \text{ Log} \left(\frac{E_1}{E_2} \right)$$

Similarly, the ratio of currents I_1 and I_2 can be expressed:

$$Db = 20 \text{ Log} \left(\frac{I_1}{I_2} \right)$$

Substituting: $Db = 20 \log \left(\frac{R - X}{X} \right)$

Note that when db = 0, R–X = X. Also, when the pot is adjusted so that $E_3 = 0$, the pot setting (R–X/X) can be calibrated in db.

[*Continued on page 101*]

A Compact 6 Meter Transmitter

BY GARY M. REUTER*, WØWWJ

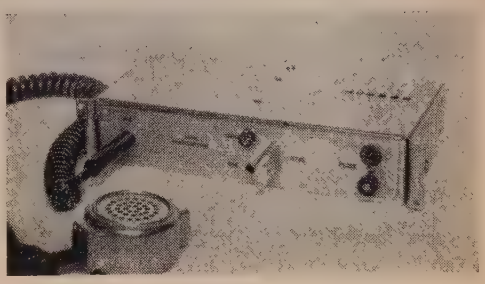
The author, pressed by the locals to get on 6, came up with this simple transmitter. The rig is crystal controlled and runs about 15 watts into a 2E26 which is plate modulated. The compact unit is built into a BC-610 tuning unit case.

QUITE a few of the local v.h.f. enthusiasts have been talking up 6 meters and because of the continuous question "When are you getting on 6?" the following transmitter took shape.

Circuit

The entire transmitter is built in a BC-610 tuning unit except for the power supply. The circuit is straightforward beginning with one half of a 12AT7 as an overtone oscillator with 25 mc output. The other half of the 12AT7 is used as a doubler to 50 mc. The final is a 2E26 with a jack in the cathode circuit for metering and keying. The modulator consists of a 12AT7 and 6AQ5. The 12AT7 is used as a grounded grid amplifier *RC* coupled to the second amplifier and the 6AQ5 is used to modulate the final with the help of a ARC-5 receiver filter choke.

*545 Edgar Ct., Webster Groves 19, Mo



Front view of the 6 meter transmitter housed in a BC-610 tuning unit measuring 9" wide, 1⅞" high and 4½" deep. The Grid tuning control is to the left of the crystal and the Plate tuning control is on the extreme right with the neon tuning indicator above it.

Construction

The tuning unit is completely stripped except for the four prong plug on the back which can later be used to connect to the power supply. Two subchassis are used, one for the modulator and the other for the r.f. section. These two

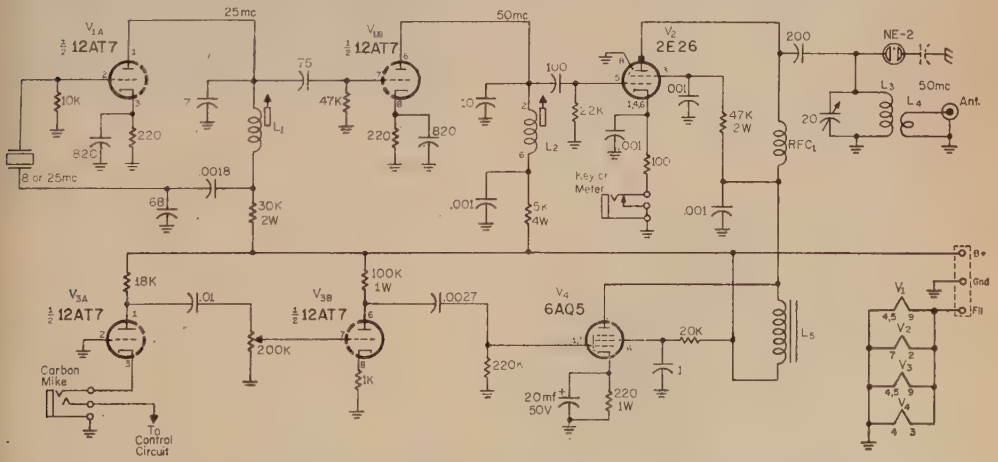
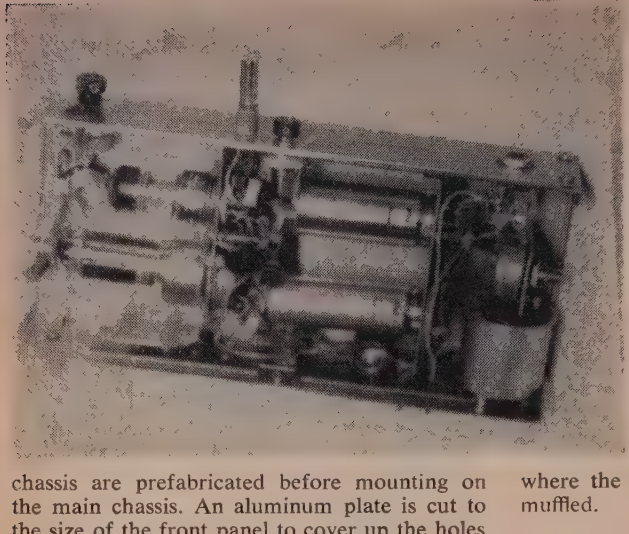


Fig. 1—Circuit of the compact 6 meter transmitter. All capacitor values greater than one are in mmf, less than one in mf unless otherwise indicated. All resistors are ½ watt unless otherwise noted.

L_1—24 t #26 enameled, close wound on ¼" diameter slug tuned form.
L_2—4 t B&W 3008 Miniductor coil stock.
L_3—6 t B&W 3007 Miniductor coil stock.
L_4—2 t #24 plastic covered, wound on cold side of L_3.
L_5—ARC-5 receiver B plus filter choke.



Top view of the 6 meter transmitter built into a BC-610 tuning unit case. The left hand subchassis contains the 2E26 and 12AT7. The right hand subchassis mounts the 6AQ5 (bottom) and 12AT7. The ARC-5 choke is at the bottom right below the audio gain control.

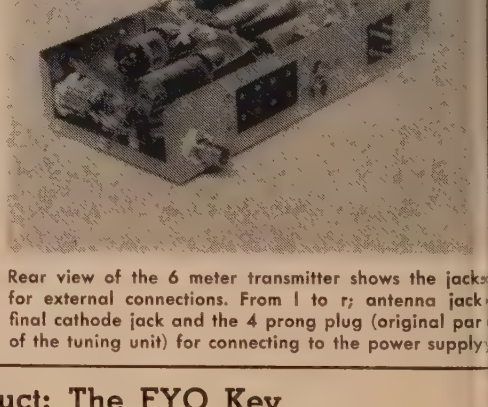
chassis are prefabricated before mounting on the main chassis. An aluminum plate is cut to the size of the front panel to cover up the holes that are not used. After accumulating the required parts for the rig they should be laid out on the chassis so that proper placement can be obtained without interference with other parts.

Tuning Up

Adjusting the rig is quite simple. Connect a power supply delivering 250 to 400 v.d.c. at 100 ma and 6.3 volts at 1.9 amps. All the coils should be tuned to their proper frequency with the aid of a grid dip meter before applying power. With the cover off, an 8 or 25mc crystal plugged in, and an open plug or insulated rod in the cathode jack of the final, apply power to the rig. With a grid dipper or a v.t.v.m. r.f. probe in the vicinity of the doubler output coil, adjust the oscillator coil slug first then the doubler for maximum reading. Check for oscillator stability by cutting the power on and off. Now remove the plug or rod from the cathode jack and with a dummy load or antenna connected, adjust the final for maximum brilliancy of the neon lamp. The audio is adjusted by getting a local amateur on the air and adjusting the modulator gain to a point just below where the audio starts to break up or becomes muffled.

Results

No DX records have been set with this rig and probably won't be. But with a vertical it works very nicely around the Portsmouth area and I am not plagued with the old question "When are you getting on six?"



Rear view of the 6 meter transmitter shows the jacks for external connections. From l to r; antenna jack, final cathode jack and the 4 prong plug (original part of the tuning unit) for connecting to the power supply.

New Amateur Product: The FYO Key

A brand new item sure to stir up a lot of interest among the brass pounders is the FYO Key. Uniquely designed for use with any of the popular electronic keying units, the FYO Key provides for a complete range of adjustments to suit any fist. In fact, even the thumb portion of the paddle can be adjusted for both height and angle. Each part of the key is precision machined to fine tolerances and either polished or chrome plated to contrast with the black-wrinkle finish base; a truly fine piece of machinery. The FYO Key measures only about 4" × 4" × 3" high but weighs in at a hefty 2½ pounds. For more details check A on page 110.

DXpedition To Africa

Part III, Conclusion

BY GEORGE R. (DICK) McKERCHER*, WØMLY

WØMLY/TJ8 is now past history. However, this last leg of the operation started when after signing off as TT8 at Ft. Archambault, I departed for Duala in the Cammeroons as WØMLY/TJ8. I arrived in Duala on the 28th of June and everything was in readiness, even the hotel reservations were waiting for me. It was quite a switch. The day after my arrival I applied for permission to operate and this was readily granted after I produced the other letters which I had from the previous places. After obtaining operating permission, my next stop was to the airport for the equipment and there it was. Although I anticipated some delay at Customs, I discovered that all I had to do was to produce $20.00 and I was on my way with the equipment. Getting the equipment into the hotel room and set up was no problem, however, I didn't make it common knowledge that I had put an antenna on the roof out of sight of ground because I was sure Management would not approve. The first night of operation, all went well, which was June 29th, 1962. My first contact after eight CQ's was DJ1BZ at 1535 GMT followed by DL1PM at 1536 GMT and W2AEB at 1537.

The following day I decided to go down to the Post Office and upon my return to the hotel, the Manager called me into his office and demanded an explanation concerning the things in my room. It seems the cleaning boy "discovered" them and naturally reported it. After much discussion it was decided that I could remain if I paid the equivalent of $2.00 a day extra for the electricity which I would be using. Since this was the only hotel, I agreed. From this point on, operation proceeded without any problems and ended July 5th, 1962 at 0619 with I1AMU finishing up as the last contact and I'd had 2028 QSO's. The gear was now packed up and shipped on to Contonou Republic Dahomey.

The trip from Duala to the Contonou Republic of Dahomey was quite uneventful. I arrived on Saturday, July 7th, 1962 and checked into the La Plage hotel. On Sunday, since it is a day of rest, I did just that by lolling on the beach and swimming in the Gulf of Guinea. It was a beautiful day and I thoroughly enjoyed it. This was heaven compared to the Central part of Africa. The breeze from the ocean was unbelievable.

Another good thing was that my hotel was only one block away from the Air France office and they were open on Sunday. I just went down to take a little look and sure enough, the equipment was there, but it had not yet gone through Customs. So bright and early Monday morning I headed for the office of the Minister of Interior with all my papers and found that I only had one problem. He wasn't there. He was on vacation. So, after much explaining to the Director of the Interior and since I guess he felt that he was in charge and wanted to use some authority, permission was granted. I didn't argue. As far as my call was concerned, he said I could have any call I wanted so TY2MY was borne into existence for ten days. On July 9th, with all matters squared away and everything very official down on paper, I was on my way. Now, all I had to do was pick up the equipment. I say "all" because since I had no problems yet I felt this part would be a snap, fool that I am. Upon arrival I found that I had to go to Customs. Seemed like no problem until I learned that Customs was across the river, three miles away. So, off I go once again. There I learned that I had to pay 30% duty, but by this time I had learned to shrug my shoulders and wave my hands with the best of them, and was hoping for fast and favorable results. He wanted to know what I intended to do and what was the equipment for. I explained that I was a salesman and these were samples to show. He understood this, so would I please bring the gear to his office after lunch for an inspection.

One of the few places where Dick had no trouble with customs, visas and such was Ouagadougou, Mali. Not so for most other places, however.

*Perry, Iowa.

After his arrival stateside, Dick explains to Earl Lucas, W2JT that he's nowhere to be found in the log.

Figuring this might be a little opening, I invited him to have lunch with me. Lunch at the hotel was very good and we agreed that he would return to his office while I would pick up the gear and deliver it for inspection. When I got to the Air France office they requested Customs papers, I explained before I could get the papers I had to deliver the equipment there for inspection. I was advised, no papers, no equipment. Finally, I decided to call the Customs officer and he told Air France to send the equipment over to him which they did and they opened every single box for my friend, the Customs officer, so that every single piece of gear could be examined. To him the HT-37 and SX-115 don't look like receivers, well, not like any he's ever seen anyway. However, after his free lunch I guess he wasn't in too much of a mood to argue. Next he wanted to know how he could be sure I would take everything when I left. I told him we could weigh everything and it would be the same weight coming in and going out. So, with a deposit of $300.00, one third of the total value, I departed for the hotel. All I kept thinking was I sure hope I get this money back since it belongs to the Yasme Foundation.

The first thing I did was to install the vertical for hurry-up operation. I opened up shop at 1547 GMT on July 9th with ZS1JA, followed by ZS6AMV and MP4BBW. The first W was K5FLD at 1955 GMT ninety contacts later. The band was really lousy.

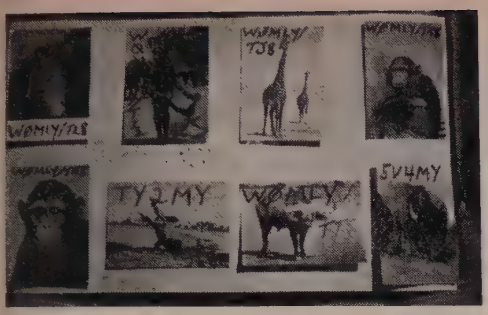
The next day I wanted to put up the beam, but no dice. So I had to stick it out with the vertical. After an uneventful operation, except for band conditions being poor, operation was closed down on July 16, 1962 at 0630 GMT with OH2PM I had 1674 contacts, not as well as I would have liked to have done, but the best I could do under the band conditions. During my stay at Contonou, I made a trip to Lome to get my operating permission and before you knew it I was on my way.

Lome, Togo, 5V4MY

Having packed the gear on Monday, July 16th, I proceeded to check out of Customs, picked up my $300.00 deposit, and sent the equipment on its way via Manning bus. This is the means of transportation between Contonou and Lome. Usually there are twenty to twenty-five people on the bus and overhead is all the baggage, some of which is chickens, bicycles, goats, *etc.* So, with all this, what would a few boxes matter. Upon arrival at the border, all passengers pile out and walk by the Police and Duane. The papers are then checked and a casual look is given to the "baggage" overhead. Then the bus is driven across the border and everyone piles back in. One thing, since I thought it would have been quite obvious if I had put all the boxes on one bus, I put only one box on a bus and six buses later, all was in the clear. Now, all I had to do was be in Lome when they all arrived. For a change, no hitch, and I checked into the Hotel Benim. This was class. Six stories, high, swimming pool, air conditioned. I was really living. Then, in the afternoon, surrounding the pool were bikini-clad decorations. What living and for only $18.00 a day. Getting back to business I learned that I could put an antenna on the roof but no beam. Operation was started at 1531 GMT July 17th with 6O1ND on the third CQ, then HB9KO at 1534 GMT. First W was W3ZKH, 67 contacts later. Band conditions were still poor. During my stay, I called on the Minister of Public Affairs for Mali, whom I had met when I applied for permission to operate in Togo. He was staying at the same hotel. After a few drinks, and a delicious meal, I approached him with the idea of operating in Mali. I showed him the equipment and how it worked. He was impressed and said he would inquire whether or not this was possible. Three days later I was informed that I could return the following Monday if I cared to. Everything was set. Since I had intended to finish up on Sunday, everything was working out well. Only comment to make at this point was that band conditions were poor and I was learning about some kind of ruling being made by the ARRL.

It was starting to get interesting. I could find no clear spots to operate s.s.b., the South American a.m. boys murdered me. With 1646 contacts, I completed operation, gear was packed and I departed for the airport. All I kept thinking was what lies ahead in Bamako. I had heard many stories about the place, but I felt there wasn't too much to worry about. We'll see.

En route to Bamako, there were no incidents. We did stop off at Ouagadougou for a few minutes, but that was all. There were no problems, not with Customs, not with Police. Perhaps because I was with the Minister of Public Affairs? He suggested that I stay at his brother's house and I went along with the idea as I felt I was on thin ice to begin with. As you probably know, Mali does not lean toward the West, which is putting it mildly. At the house, after proper introductions were made, I was shown my room, which was on the second floor and very nice. I learned that only



If you've got this octet of very desirable QSLs, consider yourself a lucky fellow. Only a handfull of these cards were sent direct.

servants and stock used the first floor of the house. The equipment was delivered the next day and I was soon set up and operation was started July 24th at 1210 GMT with SP9PT followed by OK2KOG at 1212. The first W was K4TML at 1610 GMT followed by W2UVE at 1611 GMT. The band was very good that night, however, the following day it was very poor again, and it was the only time I was unable to keep a sked with KV4AA. I had only 79 contacts on the 25th and none in the USA. The band closed at 2043 that evening. The next morning I was up at 0500 GMT and I had no contact until 0554 which was with MP4BBW. While talking to Ian, I remarked there was a large amount of shouting and talking going on outside, however, I didn't pay too much attention to it. About ten minutes later, there was a pounding on the door. I told Ian to stand by and answered the door. A native was yelling Fumer, Fumer! Taking a quick look, I grabbed the mike and told Ian the place was on fire. I started thinking of things to take out. I did grab the logs and a few other things and headed out the window, across the roof and dropped down to the ground, which was about ten feet below. I was going to go back for more but the fire was well under way and there was no chance at all to get back in. Fortunately, my passport was at the American Embassy, my plane ticket was at the airlines office. Some of the papers were lost along with the camera, and some money. All the gear was lost. Nothing left to do but pack up and head for home. I left on Saturday, July 28th, on Air France heading for Paris. The last contact was, of course, MP4BBW, being contact #710 from Mali. You might say the DXpedition ended in a blaze, however, not one of glory. I arrived in Paris at 0700 GMT on the 29th and departed for New York City at 1200 GMT. I arrived in New York at 2031 GMT Sunday, July 29th. I rented a car and drove to W2JT's house because I had left my car there. Because I seem to time things right, I walked in on Earl's birthday party. That evening several of the NJDXA members came by to visit and we talked over the goings on of the trip. The next day was spent in New York City, trying to get all matters squared away and Monday evening I was given a very fine steak dinner by the gang. Brother, did I enjoy it.

On Tuesday, I left for Flint, Michigan to visit with W8EWS and gave him a rundown of the trip. Thereafter, Chicago was the next stop and I tried to explain the loss of the gear. A great weight was lifted from my shoulders when I was told not to worry too much about the loss. Had it not been for Halicrafters, this DXpedition would not have been possible nor would it have been as successful. Because of their generosity, Hams all over the world have many new countries and I had a thoroughly enjoyable experience, save for a few incidents here and there.

I left for home on Friday and arrived at 7:30 P.M. local time. Sure was glad to be there. Next morning, after taking one look at the yard, the garden, and a few chores to be done, I was ready to return to Africa.

Well, it was all over. I want to thank all the fellows who were cooperative. There was no one deleted from the log. Some might be having difficulty receiving QSLs because of various reasons, time, date, s.a.s.e., etc. However, all in all, considering the entire operation I had 99% cooperation. The other 1%, of course, has sent quite a few "pleasant" letters to me, but that's how it goes. Can't please all the people all the time.

One thing I can say with all sincerity. I did the best I could. That is all I could do. After talking to quite a few fellows since I've been home, I feel pleased in knowing most of you aren't complaining. That's good because who knows, I might just do it again some time.

Vy 73, Dick, WØMLY

"Sorry, old man, but they say you're getting into their drums."

Results of the 6th Annual *CQ* W. W. S.S.B. Contest

March 24-25, 1962

Irv and Dorothy Strauber, K2HEA/K2MGE
Sideband Editors, CQ

THE 6th Annual CQ World Wide S.S.B. Contest proved to be "The Contest of the Year", thanks to extraordinary band conditions and superior operating techniques. Enthusiastic comments flooded us from all parts of the world, many of them from "first-timers" who had never participated in a sideband contest before, all expressing delight and some surprise at the high standard of operating encountered and at the high interest brought forth by this Contest.

Winner and new world-wide champion is Ami Shami, 4X4DK, who made the astounding total of 310,450 points to easily lead the field of the world's top sideband operators. Using a home-brew phasing exciter driving a single 4-400A in Class AB2 to 250 watts, a BC-348 and sideband slicer, and a ground plane and dipole; Ami made the most of his equipment to emerge as top man. He becomes this year's winner of the K2HEA-K2MGE Trophy, a duplicate of which may be seen in the photograph of Olliver, ZS5JY, receiving his award for last year's Contest.

Close behind Ami was Dr. Harry Schönherr, DL3LL, who, last year lead the German sideband contingent but didn't quite make the Top Ten category. Win McGee, ZL3DX, took a big jump this year from 10th to 3rd place in the world. Win has been a consistent winner over the past four years and it's always good to see his call on the roster. Ron Perks, G4CP, who was top scorer in England for last year's contest after having been on sideband for only one month, outdid himself this year to wind up as the fourth highest scoring contestant in the world.

Warren, ZL1AIX, is a newcomer to sideband contest activities but we'll wager that, after his fine showing this year, we'll be hearing more of him. Warren made up for lost time by taking over fifth place, to be closely followed by Geoff, G3JUL, who did a magnificent job of operating the sideband station of the British Science Museum, GB2SM. (Incidentally, one of the neatest logs we received came from this station.)

Olliver Pearce, ZS5JY (right) is shown being presented with the K2HEA-K2MGE Trophy after he won the 5th Annual CQ S.S.B. Contest in 1961. Making the presentation is Charles Short, ZS5RY, chairman of the Durban branch of the South African Radio League. A duplicate of the Trophy will be sent to 4X4DK for being the top scorer in this year's Contest.

Another newcomer to the Top Ten was Louis Kaiser, 9G1DP, who caused a tremendous stir operating from Upper Volta as XT2Z. Louis' log contained a plaintive comment that he could have made many more contacts if stations had refrained from continuous calling on his frequency. Winding up the list of the world's Top Ten sideband contestants were our good and faithful friends, Goran, SM6SA; Olliver, ZS5JY, last year's Contest winner; and Ian, MP4BBW; all famous calls in amateur radio and all courteous and skillful exponents of good sideband operating.

As top contest operator in the United States, Don Sleeper, W1ONK, will be the first to receive the new W2SKE Trophy which is being donated by Bill Leonard to the highest scoring W/K operator in the S.S.B. Contest. Don nosed out a lot of keen competition, including the master W2SKE himself, and we are proud of his achievement.

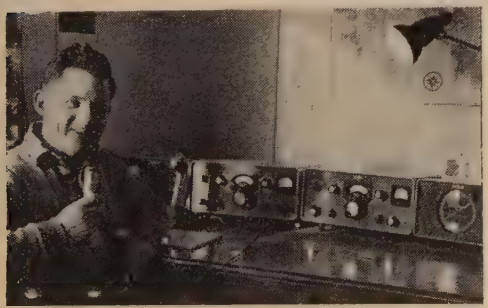
The Mickey Unger W8YIN Memorial Trophy goes this year to Tom Gabbert, K3NZV, ex-TI2TG, K6INI, who used the Collins S-line barefoot to a TA-33 and a 450 foot long wire

Ami Shami, 4X4DK, of Jerusalem, Israel, is the winner of the 6th Annual CQ World Wide S.S.B. Contest. He is shown here operating the rig with which he became world champion of the sideband contest activity for 1962.

Here is Dr. Harry Schonherr, DL3LL, of Ludwigsburg, Germany, who is a consistent winner in ham contests. Harry was the second highest scorer this year and tops among the German contestants.

to far outscore his nearest low-power competitors.

It is, of course, gratifying to the organizers of a contest to receive only the most approving and enthusiastic comments and this was our happy lot this year, with most of the credit going to Bill Leonard, W2SKE, whose vast background of contest experience provided the basis for the new rules. With sideband activity growing by leaps and bounds from year to year, we have found it expedient to make changes in the rules to accommodate the increased activity and changing band conditions, and we expect, if necessary, to make other changes to keep this sideband contest the top notch one it has proven to be. One of the most frequently noted suggestions, after this last contest, was that the rest period be altered preferably to two 3-hour periods. Because of the amazingly good conditions which prevailed, many operators were hard put to choose the right time to shut down for the required 6-hour silence period and were chafing at the bit to continue on and take advantage of all the DX that was rolling in. Even though we were lauded for being "mind readers" after choosing such a wonderful weekend, there is nothing to guarantee that next year's conditions will be comparable, but we will certainly bear the suggestions to alter the rest period in mind.



Wyn McGee, ZL3DX, of Christchurch, New Zealand, who has long been one of sideband's top operators. Wyn occupies third position among the Top Ten.

Another frequently made suggestion which we definitely will incorporate into next year's rules will be the division between single band and multiband operation. Even though it is not indicated in the published results, many of the high scoring stations used 20 meters exclusively and, of course, it is unfair to judge single band operation in the same category as multiband operation.

Next year, we hope to furnish a prefix check list which it will be mandatory to return with your logs. We have no doubt that quite a number of stations will be surprised to see the difference between their claimed and published scores, due to the fact that we discovered duplication in some cases.

Several comments were received regarding the possibility of counting prefixes separately for 40-80 meters from those counted for the lower frequencies. It was felt that this would encourage greater activity on these bands which this year was not evident because of the superior conditions on 20. We shall have to see how things go over the next months in order to determine whether it would help the contest to weigh the scales more heavily in favor of 40 and 80.

Louis Kaiser caused some mammoth pile-ups when he operated during the Contests as XT2Z from Upper Volta. Louis is shown here operating from his home QTH in Kumasi, Ghana, from which he has made the call 9G1DP famous.

It was drawn to our attention that, with the rules as they now stand, it is almost impossible for any North American station to win this contest. All we can say is that you can't have everything! If this is to be a DX contest in the true sense of the word, it is impossible to give the North Americans, particularly the W/K stations, any scoring advantage without causing the same kind of interference as was evident last year. We know that the W/K stations are good sports who enjoy working a contest without necessarily winning it and that they will continue to supply plenty of activity from this part of the world.

As will be noted, we have decided to bow to popular demand and issue certificates to the top stations in each country, regardless of the number participating from the country. It is hoped that this policy will encourage the par-

The call of Don Sleeper, W1ONK, of Fairhaven, Massachusetts, is a familiar one in many Contest results. This time, we are proud to acknowledge Don as the top W operator in the 1962 S.S.B. Contest. He is the winner of the W2SKE Trophy which is being awarded for the first time this year.

ticipation of more unique stations in next year's contest.

One final comment—in glancing over the results that follow below, bear in mind that most of the operators with low scores could not devote full time to the contest. Their low scores in no way reflect upon their operating ability. We are very grateful for the support and cooperation of these and similar stations who submitted their logs, thereby enabling us to do a more efficient and thorough job of checking the results.

Top Ten

4X4DK	310,450	GB2SM	163,064
DL3LL	290,836	XT2Z	152,866
ZL3DX	211,391	SM6SA	145,114
G4CP	171,248	ZS5JY	143,748
ZL1AIX	164,000	MP4BBW	140,910

Following listings indicate the calls, the totals, number of points made, and the number of different prefixes worked.

North America

United States

W1ONK*	104,208	668	156
K1RTB	41,140	374	110
W1ORV	29,425	275	107
W1AOL	29,380	260	113
W1RF	17,776	202	88
K1HMD	5,000	100	50
W1FZ	3,906	93	42
W1PLJ	2,208	69	32
W1GYE	2,046	62	33
W1QV	2,046	62	33
W1WY	1,806	43	42
W1AWE†	589	31	19
W1QCO	check log		
W2VCZ*	100,571	617	163
W2SKE	88,788	604	147
K2IEG	87,204	507	172
K2UVU	79,800	525	152
K2GXI	70,216	536	131
W2QWS	32,340	330	98
WA2SFP	21,385	235	91
W2QKJ	20,880	232	90
K1BVI/2	6,649	109	61
WA2HOK	4,944	103	48
WA2IZS	2,240	64	35
WA2RNM†	1,798	62	29
W2WZ	check log		
W3TLN*	67,480	482	140
K3UDX	59,928	454	132
K3NZV†	34,860	332	105
W3CJI	25,425	225	113
W3FDH	11,220	165	68
W3OCU	10,850	175	62
W4HXC*	35,861	329	109
W4INL	29,680	280	106
W4RLS	29,256	276	106
K4HSF†	15,480	180	86
W4QD	9,724	80	68
W4DS	3,913	91	43
W4HVU	570	30	19
W4EEO	544	34	16
K5MDX*	51,013	367	139
K5FLY	17,910	199	90
W5AJY	13,224	152	87
K5OGP	2,773	59	47
W5SU	675	45	15
W5EDX	504	28	18
K6EVR*	54,496	416	131
W6NJU	15,008	224	67
W6YMV	10,833	157	69
W6EYJ†	3,458	91	38
K6UMQ†	924	44	21
W6SUD†	703	37	19
W9YHE/7*	11,360	160	71
W7NLB	9,882	162	61
W7DLR	4,872	84	58
W7PZ	680	34	20
W7BTH†	231	21	11
W8KIA*	78,407	487	161
W8CLR	34,578	306	113
W8BKO	27,918	282	99
W8TWA/8	19,280	241	80
W8UMR†	8,037	141	57
W8JIN	4,173	107	39
K9EAB*	32,190	290	111
K9IUI	4,876	92	53
W9ROM	2,523	69	37
W9VSO	check log		
WØNFA*	40,777	337	121
WØBTD†	19,536	222	88
KØOQT	18,200	200	91
KØSCM†	3,276	63	52
KØIKL	2,332	62	36
WØALA	1,190	35	34

Alaska

KL7EBM*	44,500	356	125

Bahamas

VP7BP*†	49,985	769	65
VP2GAC	35,283	619	57

Canada

VE1WL*	36,540	348	105
VE2PB*	14,744	194	76
VE3ES*†	19,106	233	82
VE3BJO	15,326	194	79
VE3PV	5,670	135	42
VE3DYB†	779	41	19
VE6TF*	12,410	170	73
VE6TP	5,656	101	56
KL7DMD/VE8*†	2,788	68	41
WA5ABA/VO2*†	37,932	436	87

Canal Zone

KZ5LC*	38,808	441	88

Costa Rica

TI2HP*	116,840	920	127

Greenland

KG1BX*	18,615	365	51

Mexico

XE1ZE*†	67,068	729	92
XE1TJ	20,240	368	55

Puerto Rico

KP4AVQ*	40,400	565	80

Virgin Islands

KV4CM*	9,143	223	41

Africa

Angola

CR6CA*	69,399	701	99

Ghana

9G1GN*†	24,072	472	8

Liberia

EL4A*†	13,884	267	8

Republic of Upper Volta

XT2Z*†	152,866	1253	12

South Africa

ZS5JY*	143,748	1452	9

Swaziland

ZS7S*	481	37	1

Tanganyika

5H3GC*†	18,216	253	7
5H3HH†	2,184	78	2
5H3PBD†	check log		

Asia

Bahrain Is.

MP4BBW*	140,910	854	16

Hong Kong

VS6EK*	16,224	169	9
VS6EO†	1,596	53	3

Iran

EP2AT*†	37,530	417	9
EP2BB†	32,123	353	9
EP2AG	416	32	1

Israel

4X4DK*	310,450	1774	17
4X4OC	11,682	177	6
4X4FQ	check log		

Japan

JA2AEY*	32,571	423	7
JA2JW†	15,264	212	7
JA1ANG	10,530	162	6
JA1FDL†	6,975	155	4
JA1CFN†	1,173	51	2
JA1LZ†	720	40	1
JA6AFZ†	589	31	1

Korea

HL9KT*†	9,360	130	7

Okinawa

KR6GF*	73,948	556	13
KR6LJ	21,204	279	7

Laos

XW8AS*†	35,991	387	9

Thailand

HS1B*†	5,029	107	4

U.S.S.R.

Asiatic

UAØKAR*	137,749	991	13
UW9CC	28,124	316	8
UW9AF	11,549	187	6
UA9DT	6,432	134	4
UAØWC	5,875	125	4
UA9TF	2,790	62	4

*Indicate certificate winners.
†Indicated power under 175 watts p.e.p.

Undaunted by using a barefoot rig, Tom Gabbert, K3NZV, of Washington, D.C., is the top-scoring low power U.S. station in the 1962 Contest and will receive the W8YIN Memorial Trophy to commemorate his victory.

Azerbaijan

UD6BI*	9,741	191	51

Georgia

UF6FB*†	2,128	76	28

Armenia

UG6AW*†	9,010	170	53

Uzbek

UI8AC*	14,630	209	70

Kazakh

UL7JA*	42,436	412	103

Europe

Austria

OE1RZ*	125,391	853	147

Belgium

ON4XD*	37,572	404	93
ON4AD†	28,032	292	96

Bulgaria

LZ1HA*	2,738	74	37

Crete

SVØWT*	109,600	1,096	100

Czechoslovakia

OK3KAB*	23,316	268	87
OK2XA†	6,370	130	49
OK1FG†	check log		

Denmark

OZ5JT*†	60,900	609	100
OZ7FG†	10,920	280	39
OZ7BQ†	10,200	136	75

DL5AC	80,155	943	85
DJ1ZG	51,397	499	103
DLØIB†	44,978	523	86
DL9PU†	30,213	373	81
DJ3CP	24,472	266	92
DL9EM	18,559	277	67
DL2AB	18,239	299	61
DJ2DW†	15,080	377	40
DL7AD†	11,776	184	64
DL4XF	3,318	79	42
DL9YC†	1,656	72	23

Greece

SVØWL*†	12,172	179	68

Ireland

EI8P*†	50,685	545	93

Italy

I1CWX*	53,998	406	133
I1TBU	6,210	115	54

Madeira Is.

CT3AV*†	8,550	190	45

Mozambique

CR7CI*†	4,674	123	38

Netherlands

PAØPRF*	3,204	89	36
PAØFAK†	966	42	23
PAØJPC	check log		

Northern Ireland

GI4RY*	2,156	77	28

Norway

LA5LG*	57,456	504	114

Here's the gang at SVØWT. L. to r., Larry, WA8CTP; Al, W5GMS/SVØWH; Ron, K3SLZ; and Tony, KØCGE/SVØWY. Through their contest activity the Island of Crete has become much less rare.

England

G4CP*†	171,248	1232	139
GB2SM	163,064	1496	109
G3DO†	79,722	618	129
G3NFV†	41,664	448	93
G3MEA	36,252	342	106
G3NMR†	31,680	360	88
G3FPK†	14,976	192	78
G2HFD	1,911	49	39

Faeroes Is.

OY7ML*	141	16	9

Finland

OH2XZ*†	47,380	412	115
OH2RZ†	29,808	276	108
OH2GF	20,475	225	91
OH3TY†	4,070	74	55
OH2CM	2,210	65	34
OH2KL†	800	32	25

France

F8PI*	61,270	557	110
F9KH†	360	23	20

Germany

DL3LL*	290,836	1598	182
DL4FX	125,860	899	140
DL2DM†	86,250	690	125

Poland

SP5HS*	29,892	318	94
SP5PO†	7,695	135	57

Portugal

CT1YE*	85,200	852	100

Roumania

YO3ZA*†	7,424	128	58

Scotland

GM3JDR*†	33,516	342	98
GM3CIX	6,630	130	51

San Marino

M1SVZ*†	125,906	1067	118

Spain

EA3GZ*†	33,530	479	70

Sweden

SM6SA*	145,114	1369	106
SM5BLA	117,196	773	152
SM5BPJ	13,286	182	73
SM3CNN†	11,430	170	69
SM3VE	9,768	148	66
SL4ZH	7,056	168	42
SM5MC	5,225	95	55
SM5BMN	1,824	57	32

Ian Cable, MP4BBW, of Bahrein Island, winds up in the Top Ten Winners' circle for the first time but as any sidebander knows, Ian doesn't need a contest to be a champion operator!

SM7CAB†	91	13	7
SM5AZU	check log		

Switzerland

HB9ZY*†	87,543	639	137
HB9UD†	5,247	99	53
HB9EC†	check log		

U.S.S.R.

European

UA1KBW*	84,672	672	126
UW3UF	80,256	608	132
UA3FG	77,103	659	117
UA1CK	36,972	316	117
UA4HP	28,028	286	98
UN1AB	13,528	178	76
UA3DR	11,076	156	71
UA3CG	9,800	140	70
UA4CE	9,453	137	69
UA6KOD	5,490	90	61
UA1MU	3,723	73	51
UA6FD	2,632	56	47
UA1OE	920	46	20
UA1CC	522	29	18

Kaliningrad

UA2AO*	110,654	907	122
UA2AB	5,060	110	46
UA2AW	2,376	66	36

Ukraine

UB5WF*	110,400	800	138
UB5UN	9,394	154	61
UB5CI	1,617	49	33

White Russia

UC2KAA*	13,338	234	57

Lithuania

UP2CG*†	14,768	208	71
UP2KNP	1,222	47	26
UP2NV†	check log		

Latvia

UQ2AN*	5,989	113	53
UQ2KAD	3,549	91	39
UQ2DT	check log		

Esthonia

UR2KAT*†	17,150	343	50
UR2AT	8,160	136	60

Oceania

Australia

VK3AHO*	128,250	1026	125
VK2NN*†	80,920	680	119
VK6RU*†	62,167	581	107
VK5QR*†	16,302	247	66
VK2AKF†	10,272	214	48
VK3HL†	2,380	68	35
VK2AQJ†	1,860	62	30

Kwajalein

KX6AS*	41,820	615	68

New Zealand

ZL3DX*†	211,391	1543	137
ZL1AIX†	164,000	1312	125
ZL1AAS†	45,496	484	94

Wake Is.

KW6DG*	14,874	222	67

South America

Argentina

LU3EQ*	43,792	476	92

Brazil

PY2BPE*	65,163	609	107

Netherlands Antilles

PJ2AA*	107,255	1129	95

Surinam

PZ1AX*	133,030	1255	106

Uruguay

CX2AY*	4,380	146	30

Venezuela

YV1EL*	77,142	989	78
YV3BG†	28,632	494	58
YV3BT	5,312	166	32
YV5ADZ†	5,280	160	33

Making the most of a rare G prefix, Ron Perks, G4CP, of Newton, England followed up last year's success by not only again topping the other British sidebanders but also by increasing his score to wind up in fourth place on a world-wide basis.

A COMBO POWER SUPPLY

BY RALPH J. FILES*, W2PWJ

An Ideal Power Supply For The Low Power Exciter

SHORTLY after an article appeared in 1958 describing a sideband package I built the transmitter and operated it with good reports and fairly good results but two problems showed up in the power supply which could not be remedied by juggling components. One of the two v.r. tubes used in series to regulate a 195 volt line extinguished at high modulation levels and a slight variation in the 195 volts at the end of a transmission (when there was a considerable drop in load current) acted on the vox circuit to trigger the relay on again. Sometimes the relay would continue cycling until the mode switch was turned to the SPOT position where the relay return was opened. Since that article was published, variations of the sideband package and other low power sideband generators with approximately the same power supply requirements have appeared. Possibly constructors of these transmitters have had similar problems.

The solution lay in an electronically regulated supply for the 195 volts, but it also seemed desirable to raise the high voltage to the 6146 final from 450 volts to 700 or 750 volts to provide enough output to drive a future half gallon linear amplifier. As there were several voltage requirements to be met for various stages doubts came to mind whether there would be sufficient stability of the medium B-plus with the wide excursions of the 6146 plate current (from 12 ma resting to 110 ma peak) if all these voltages were derived from one transformer.

*1120 Lake Shore Drive, Massapequa Park, L.I., N.Y.

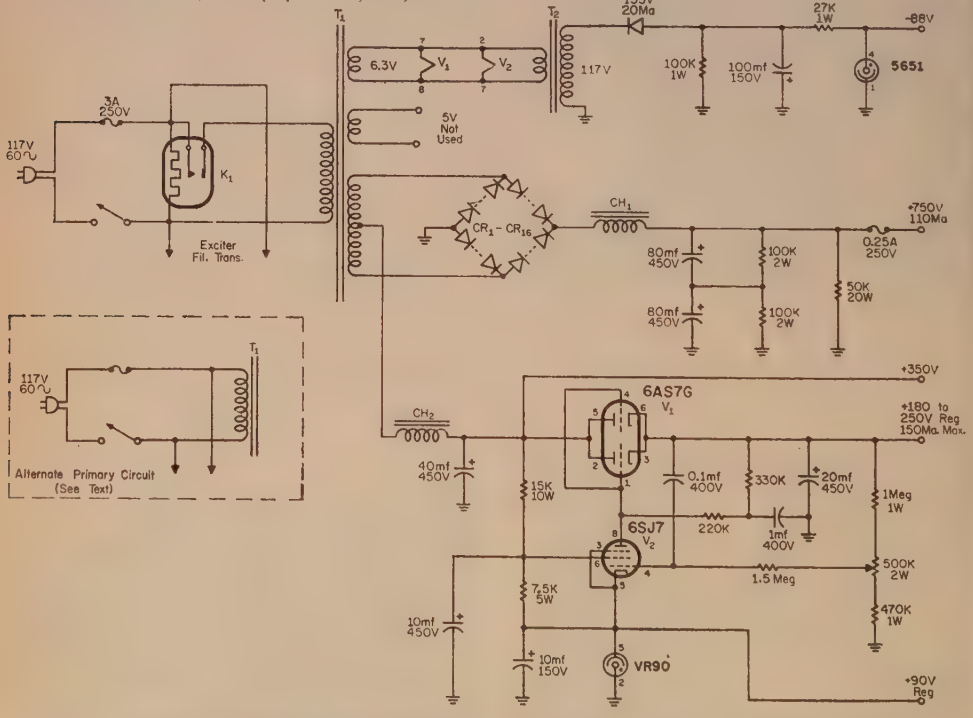


Fig. 1—Diagram of a complete power supply for the moderate power transmitter, providing an electronically regulated screen supply of 200 v.

CR_1-CR_{16}—TAB T-300, 300 ma, 400 p.i.v.

CH_1—4-20 h at 150 ma, swinging choke. Triad c-31A.

CH_2—4-10 h at 150 ma, approx. 200 ohms d.c. resistance. Triad C-12X.

T_1—800-900 v.a.c., c.t., 200 ma. Stancor PC-8412 or Triad R-21A.

T_2—6.3 v.a.c. at 1 a. Stancor P-6134 or Triad F-14X.

Circuit and Components

In building the original supply the author's specified transformer was not used because one on hand approximated the requirements, except that the high voltage winding produced a d.c. output 50 volts higher. The full secondary r.m.s. voltage of the transformer on hand was 900 volts and to get the peak inverse voltage you multiply this by 1.41. To handle this voltage across a silicon bridge required four diodes per leg, each diode rated at 400 p.i.v. at 300 ma. A total of sixteen diodes costing about five dollars were obtained from TAB in New York City. The 1600 volt total p.i.v. provides an ample safety margin.

No peak-charging current-limiting resistors were used because of the choke input of the filters (fig. 1). Had a capacitor input been employed at either filter the series resistors would have been mandatory. The plus 350 volts available after the center tap filter feeds the electronic voltage regulator system. A VR-90 is used as a reference in the regulator and this voltage is also fed to the v.f.o. The 500 K potentiometer in the string of resistors across the regulated output controls the bias on the 6SJ7 whose plate voltage controls the bias on the 6AS7 series regulator. This control permits adjustment of the output voltage to meet your requirements. The negative bias supply is commonplace except for the 5651 regulator which draws only a milliampere or two and is much more reliable than a neon bulb.

In series with the primary of the high volt-

[*Continued on page 91*]

A Tunable Audio Slot Filter

BY ARTICE M. DAVIS*, K5RKJ

A TWIN-T-FILTER such as shown in fig. 1 is a three terminal network so designed as to have zero transfer at some particular frequency. The frequency of zero transfer is determined by the relationship of R and C in the circuit with the formulas presented in various texts.[1]

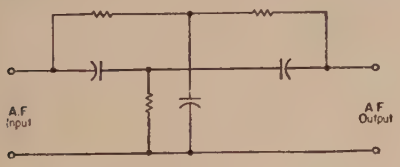


Fig. 1—Basic circuit of a twin-T-filter.

A Practical Circuit

A practical circuit, shown in fig. 2, employs a series of variables with the resistance elements continuously variable and the capacitive elements varied by switching. This arrangement permits varying the null frequency across the audio range from approximately 20 cycles to 28 kc. A necessary condition for the null is that the resistance legs remain constant in relation to each other. The upper range is obviously of little value and merely happens to be a byproduct of the component values selected.

Construction

The three pots,, R_2, R_3 and R_5 must be mechanically ganged so that when varied, the required constant relationship may be maintained. The additional pots R_1, R_4 and R_6 are located on the chassis or rear apron and are adjusted for the best null. The approximate settings for these pots are: R_1, R_4-11,100 and R_6, 1,100 ohms. These pots compensate for tracking error in the ganged assembly and should be adjusted for maximum notch depth in the frequency area used.

The variable pots, R_2, R_3 and R_5 should all have the same taper and the ganging mechanism should be as accurate as possible to maintain good tracking. The IRC potentiometers listed in fig. 2, gang together with reasonable tracking accuracy and error is corrected by adjustment of R_1, R_4 and R_6.

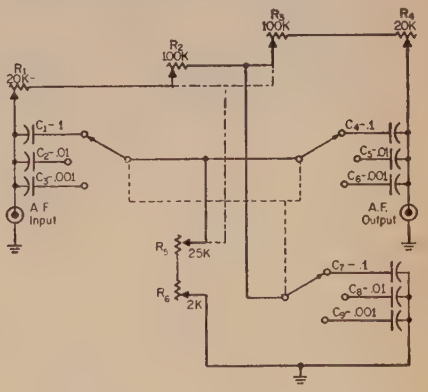


Fig. 2—Practical application of the twin-T as an audio slot filter.

R_1, R_4, R_6—See text.
R_2—100K linear taper. IRC PQ11-128.
R_3—100K linear taper. RC M11-128.
R_5—25K linear taper. IRC M11-120.

Installation

This filter can be connected at several points in the receiver circuit. The most effective point is in the output of the first audio stage, just ahead of the audio power amplifier. It can be used to eliminate hetrodynes, and interfering stations. When connected to a good receiver, it offers about the maximum in a slot filter for cost and simplicity. ■

*Route 3, Box 40-A, Leesville, La.

[1]Terman, F., "Radio Engineers Handbook," McGraw-Hill, pg. 918.

If The Bard Were On 20 Today . . .

PHILIP BERNSTEIN*, WA2DEL

ONE afernoon, a few weeks ago, I was sitting in my room working on a lengthy research paper. The topic was "The use of the semicolon in Shakespeare." The rig was warming up in a corner of the room and I had hopes that I might be able to finish enough work so as to have time to work some of the rare DX that must have been rolling in that afternoon (rare DX always rolls in when I'm off the air!). Maybe it was the QSO between the two well-accented G's that I overheard which inspired me, but all of a sudden, a wild thought crowded all other matters from my head.

What if the Bard had been a ham?!!

Undoubtedly, it would have been with great pride that he'd have submitted his greatest works to his favorite amateur radio publication, *CQ*. Naturally this would have had a terrific bearing on literary history.

Judging from his present works, we find that the Shakespearean play with the greatest possibilities is *The Tempest* (no not HAMlet!).

The Tempest is the tale of a benevolent ruler, Prospero, who would rather ham than attend to the affairs of state. The running of his government he leaves to Antonio, his brother. But Antonio, an ambitious man, has designs on the royal kw and neatly arranges for Prospero's exile. Out of humane kindness, Gonzalo, who is Prospero's DX Councilor, secretly stows a mobile transistorized kw in the boat in which Prospero and his three year old daughter, Miranda, are set adrift.

In time, the craft reaches a desert island and, rather than let a good exile go to pot, Prospero decides that the island is as good a spot as any for a DXpedition. It turns out that the island is inhabited by Caliban, a scurvy character with a long record of TVI and out-of-band operations, and by a host of sprites who live under their chief, Ariel. After training both the sprites and Caliban to obey his will, Prospero has Ariel, who is blessed with the power of levitation, erect a number of mammoth hrombics and suspend a long wire on a sky hook.

Prospero hams in this state of bliss for twelve years by which time Miranda has her ticket, (conditional by necessity), and shows up her OM in a couple of World Wide DX Contests.

Then, in a sudden offshore tempest, a ship runs into trouble, but manages to make it to the island for repairs. When its passengers come ashore, we find that they make up a contingent from the F.C.C. and are headed by the traitorous Antonio. Also in the party is Sebastian, a notorious bootlegger and QSL counterfeiter; Gonzalo, who is still loyal to Prospero, and Alfonse and Ferdinand, a father-son team who seem to be on for the ride.

Ferdinand wastes no time in arranging an eyeball QSO with Miranda (they skedded for many years at 2000 GMT on Tuesday evenings on twenty) and for them, it is love at first sight.

The plot thickens as Ariel comes upon Antonio and Sebastian who are planning to revoke the tickets of Prospero and Gonzalo who will not let them have a turn at the island's only rig. After first warning Prospero, Ariel proceeds to torture the two villains by setting before them an s.s.b. kw and then making it vanish into thin air. He tells them that they are being punished for past sins and improper operations procedures.

Finally, Prospero decides that enough is enough and that it is now time to end the whole confusing affair. He has the sprites round up Antonio and his cronies and promises that if they will just leave him alone, he will issue to each one—even Caliban—a two-letter call. All agree to this and the celebration is to be at Prospero's shack where, to the surprise of all, we find Miranda and Ferdinand building a Heathkit together. They are given permission to become OM and XYL and to raise a fam hamily of their own.

After much drinking and revelry, all return home where they forsake the qualities of a rare DX station for the comforts of the bottom of the nightly twenty meter pile-up and rag-chews on two meters.

So we see how at least one of Shakespeare's works could have been adapted to suit our needs. His love for the hobby might show through in lines of his other plays such as "A v.f.o.! a v.f.o.! My kingdom for a v.f.o.!" or "Get thee to a repairman!"

Giving the whole issue careful thought, however, I for one have come to the conclusion that it's just as well that the old Bard lived a number of centuries prior to the invention of radio. Technical articles are hard enough for me to understand without having them set in iambic pentameter! ■

*331 Mulry Lane, Lawrence, L.I., N.Y.

S.S.B. Reception With A.M. Recievers

BY DONALD SELWYN*, W2GFR

Many amateurs have developed an interest in s.s.b. operation and are anxious to find out, firsthand, if it is all that it is cracked up to be. The stumbling block is generally equipment. Here is a simple and inexpensive means of modifying an a.m. receiver for satisfactory s.s.b. performance.

BEFORE one can participate in single sideband (s.s.b.) QSO's, he must have adequate facilities for reception. This has been the major stumbling block to the majority of hams who possess either newer and relatively unsophisticated a.m. receiver or older, very expensive receivers lacking product detectors. In either case, it is difficult to decide initially whether to invest in new equipment designed for s.s.b. and, in particular, which equipments are most suitable for a long term investment without first listening to the comments of s.s.b. stations already on the air and without having firsthand experience in the intricacies of s.s.b. reception. For these reasons, the writer decided to modify his existing a.m. receiver, a Hammarlund HQ-100, for s.s.b. reception before investing in new equipment.

Two major problems became evident from attempts to receive sideband with the HQ-100. First and most important was the difficulty in eliminating QRM and adjacent channel interference when the Q multiplier was used as a b.f.o. and not for selectivity control. Since the Q multiplier cannot be used for both purposes at the same time, it was deemed essential to add a separate b.f.o. to the receiver. If you already have a b.f.o. and do not face this problem, just skip on ahead to the portion of the article concerning the product detectors.

The lack of a b.f.o. in the HQ-100 might be overcome by substituting a new, multipurpose tube for one of those already in the receiver as Hammarlund has done with the HQ-100A. The author, having an experimental nature, chose to install an accessory socket on the rear apron of the receiver as shown in the accompanying photograph so that the b.f.o., frequency converters and other homemade experimental accessories might be tested without causing further mutilation.

The second major problem was the lack of a product detector which made tuning extremely complicated insofar as s.s.b. signals are concerned. It has been found that nearly any receiver having a b.f.o. or other oscillator for carrier injection will receive s.s.b. transmissions. The chief problem is that it is necessary to manually adjust, a.f. gain, r.f. gain, b.f.o. pitch and bandspread very carefully, all at the same time, to effect satisfactory reception. This is further complicated by the fact that the a.v.c. circuit of the receiver must be disabled so that the b.f.o. signal does not desensitize the r.f. and i.f. stages. This means, in turn, more manual adjustments so that the proper and quite critical modulation-to-carrier-level relationship can be maintained. The product detector does, of course, maintain this ratio automatically, making constant readjustment of r.f. and a.f. gain unnecessary. It also makes possible the reception of excessively strong or weak s.s.b. signals which could not be tuned in manually under any circumstances.

B.F.O. Installation

The b.f.o. circuit, shown in fig. 1, was built in a minibox so that it could plug into the accessory socket added to the rear of the receiver. The 40 mmf variable is optional and need not be used. The model constructed did not include this capacitor as one knob bandspread tuning for s.s.b. was desired.

Check all wiring before proceeding with the test. If o.k., plug the b.f.o. module into receiver receptacle. Apply power and note if the

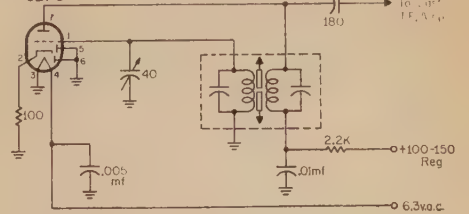


Fig 1—A simple b.f.o circuit that may be added to any existing receiver. The output is coupled to the last i.f. or second detector.

*13 Yale Way, Oakland, New Jersey

tube lights. Switch the b.f.o. on with the receiver switch. It should be oscillating if the transformer grid winding is connected in proper phase with transformer plate winding. Adjust the slug or capacitor on the b.f.o. transformer (plate circuit) for 455 kc resonance or, if instruments are not available, to mid range. Detune the receiver so that no station is being received. With a.v.c. on and sensitivity at maximum, adjust the grid transformer slug (or capacitor) for maximum S meter reading. Turn the b.f.o. off. Tune in a station for maximum signal. Turn the b.f.o. on and carefully adjust the grid circuit slug for zero beat. If the receiver has no S meter, this can be done initially with the receiver tuned to a moderately strong station. The S meter alone, with no station tuned in, should read from S9 to 40 db over S9. If too weak, adjust the plate slug for greater output. The 40 mmf capacitor, if used, should be at center position during alignment.

Product Detector

After a b.f.o. was added to the author's HQ-100 receiver, it was decided to incorporate a product detector. This step is most important and, when properly accomplished, makes satisfactory s.s.b. reception a reality for any a.m. communications receiver.

After theoretical product detector circuits were worked out and tested in the lab it was decided to make tests on the author's HQ-100. This simply involved modification of the receiver's final i.f. amplifier stage and testing under all possible a.m., s.s.b. and c.w. operating conditions. This step, accomplished entirely within the receiver, is relatively simple and entails the addition of only two components, a coupling capacitor and an r.f. choke. Mechanical modifications are limited to whatever rewiring and sheet metal work is required to shield the b.f.o. and its wiring so that little b.f.o. r.f. gets into the i.f. strip except through the final i.f.'s suppressor grid where it is intentionally introduced.

Figure 2 depicts the last i.f. stage of a typical a.m. receiver after the b.f.o. signal is coupled to the suppressor grid (grounded to d.c. but not r.f.) of the final i.f. amplifier via the shielded cable. Since the suppressor grid is grounded to d.c., the tube is biased and operates over the same portion of its characteristic curve as before. Thus, there is no need to switch any circuitry in or out when changing from a.m. to s.s.b. reception or vice versa. One merely switches the b.f.o. on or off as is desired.

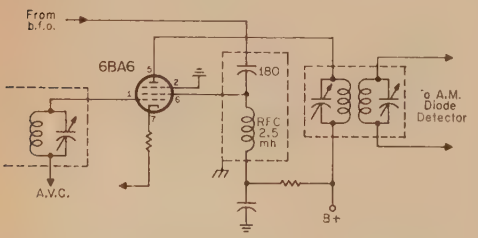


Fig 2—A partial schematic of the last i.f. stage of a conventional receiver showing the simple change necessary for s.s.b. reception.

When no 455 kc signal appears on the suppressor grid, the tube functions as before and amplifies the i.f. signal just as it appears at the control grid. When a 455 kc signal does appear at the suppressor grid two things happen; first, it mixes with the signal at the control grid producing, in the case of c.w., a beat note or, in the case of s.s.b., carrier and sum or difference sideband, which are detected by the following diode detector in the same manner as an ordinary a.m. signal. The second important occurrence with the b.f.o. injected into the final i.f. stage via the suppressor grid is that the stage's overall gain and hence the effective b.f.o. level varies with the signal intensity at the control grid. When a weak signal is applied at the control grid, fewer electrons flow past the suppressor grid to the plate resulting in less amplification of the low level b.f.o signal. Thus, it is in this manner that a nearly constant ratio is maintained between the effective injected carrier (b.f.o.) level and the effective received sideband level. The dynamic range of this ratio control depends, of course, on the gain of the particular i.f. stage employed, the absolute b.f.o. signal level, the tube's dynamic characteristic, operating bias and other factors. Nevertheless, the simple application illustrated in fig. 2 has been found to be very effective.

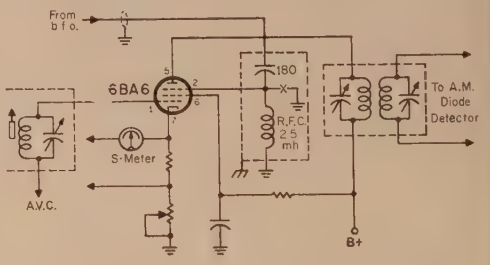


Fig. 3—An alternate but more critical method of converting the last i.f. to a product detector.

The modification just described is best accomplished by means of suppressor grid injection as shown. In the course of experimentation it was found that the screen grid could be utilized instead as shown in fig. 3. This method is more critical in adjustment than the recommended one, although it did work. It is suggested that attempts be made to substitute a tube having a separately wired suppressor grid in any receiver using a tube with an internally grounded suppressor grid for its final i.f. amplifier. It is also important, for maximum dynamic control range, to apply the modification to the last i.f. stage rather than to one of the lower level i.f. stages. ■

Voltage Regulation the Easy Way

BY IRVING B. MICKEY*, W2LCB

Although you'll find a gas filled voltage regulator tube in almost every rig these days, few people really know the "inside" story. The author surveys some interesting highlights and explains a method of obtaining regulated voltage below that of commercially available tubes.

One of the handiest little bottles on the tube dealer's shelf is the gaseous or glow discharge regulator tube, commonly referred to as the voltage regulator (v.r.) tube. Properly employed, it offers a simple and effective means of voltage stabilization in low-powered equipment. Despite its simplicity, however, the v.r. tube is a source of some confusion and is frequently used in an improper manner. The goal of this article will be to clear up at least some of that confusion and to illustrate a few of the ways in which this versatile device can be put to work.

Basic Information

Physically, the v.r. tube is simply a gas-filled envelope containing a plate and a cathode. Unlike most of the tubes we encounter, it is a cold cathode device, capable of conducting current without preliminary heating; hence, it requires no filament power. Current flowing through the gas causes it to ionize and glow.

Within its rated operating range, the tube acts like a continuously variable resistor. As the current flowing through it increases, the gas becomes more highly ionized, and the internal resistance decreases. The converse, of course, also holds true. By Ohm's Law ($E = IR$), the product of this current and internal resistance equals a constant drop across the tube which we see as our regulated voltage.

To induce ionization and to insure stable operation of a v.r. tube, the supply voltage should be at least 20-40% higher than the operating value. Exact requirements for each type may be found in amateur handbooks or manufacturers' tube manuals. Once ionization occurs, a tube current of at least 5 ma must be sustained for proper regulating action. Excessive current, on the other hand, will shorten tube life and, under extreme conditions, may cause arcing. When used correctly, a v.r. tube will render extremely long service.

The family of commonly available v.r. tubes includes four octal base types, the 0A3/VR75, 0B3/VR90, 0C3/VR105, and 0D3/VR150, all of which have operating ranges of 5-40 ma. The numbers indicate the voltage ratings. The two standard miniature types, the 0B2 and 0A2, have current ranges of 5-30 ma and voltage ratings of 105 and 150 volts, respectively (some tube charts rate the 0B2 at 108 volts). Aside from setting operating limits for the tube, the current ratings also indicate the amount by which the associated load may vary and still receive satisfactory regulation.

*1247 Baker Ave., Schnectady 9, N.Y.

Single Tube Circuit

The simplest application of a v.r. tube is shown in fig. 1, where a single regulated voltage is required for a reasonably constant load. In this example and in all of those which follow, the value of the dropping resistor, R, is the thing which must be computed in order to set up the circuit. The supply voltage, E_s, the load current, I_L, and the ionizing current, I_{VR}, must either be known or be subject to fairly close approximation. Knowing these quantities, we may compute R directly from Ohm's Law:

$$R = E_R/I_T$$

where $E_R = E_s - E_r$ and $I_T = I_L + I_{VR}$

This brings up the first point of confusion. E_s and I_L can be determined either from direct measurement or from the design specifications of the equipment; but how do we determine the value of I_{VR}? The answer is, you pick it yourself, keeping three simple facts in mind: (1) it must be at least 5 ma to insure stable operation; (2) it must not exceed the maximum rating of the v.r. tube; and (3) anything above the required minimum is just wasted current as far as the equipment is concerned. A design figure of 10 ma meets these requirements nicely and also provides for slight variations in load current.

Now let's complicate the situation a bit by assuming that the load current in fig. 1 is varying between certain known limits. The first thing to remember is that the total amount of this variation, $I_{L_{max}}$-$I_{L_{min}}$, must not exceed the

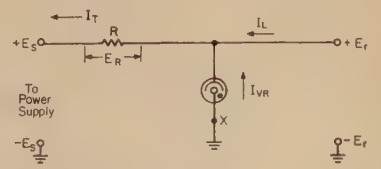


Fig. 1—Basic circuit showing the use of a single v.r. tube to provide a constant output voltage at varying load currents.

operating range of the v.r. tube. The second critical point is that, within this limitation, E_r will be held constant.

Having thus fixed E_r, and having changed neither R nor E_s, Ohm's Law tells us that I_T must remain constant as the load varies; but $I_T = I_L + I_{VR}$, and we know that I_L is varying. It follows, therefore, that as I_L changes, I_{VR} must change by exactly the same amount in the opposite direction. Within a very narrow margin of error, this is precisely what happens in the properly adjusted circuit.

Using Ohm's Law again, R may now be calculated from either end of the load swing, where:

$$I_T = I_{L\ max} + I_{VR\ min}$$
$$\text{or } I_T = I_{L\ min} + I_{VR\ max}$$

The two quantities are equal, of course, and the values of I_{VR} must lie within the rated range of the tube. In practice, R may be a slider-type resistor of slightly higher than the calculated value. It can then be adjusted to set the desired operating range. A milliammeter temporarily inserted at point "X" in the diagram will facilitate the process.

Before leaving fig. 1 another point of confusion can be cleared up. Many prospective users of v.r. tubes gain the impression that the maximum current rating of the tube places a like limitation upon the maximum load current. Such is not the case; the load current may be of any reasonable value. It simply may not change by an amount greater than the rated operating range of the tube. Practical limitations are imposed by the current rating of the power supply and the fact that the supply voltage must not be pulled below the firing level.

V.R. Tubes in Series

One of the most useful features of v.r. tubes is that they may be connected in series as shown in fig. 2 to provide different combinations of regulated voltages. The total voltage drop, E_{r1}, is simply the sum of the drops across the individual tubes. When a single load is connected to the top of the string, operating conditions of the circuit are identical to those just discussed, and R is calculated in the same manner.

When a second load is connected to the midpoint of the string, current distribution becomes more complex. The first thing to note is that both I_{VR} and I_{L2} flow *through* V_1. This means that the sum of these two currents, in absolute terms, cannot exceed the maximum current rating of V_1. I_{L1}, on the other hand, continue to be limited only in terms of total change.

Other factors to consider in setting up such a circuit are: (1) the ionizing current, I_{VR}, flows through both v.r. tubes; (2) if the total load, $I_{L1} + I_{L2}$, shows a net increase, I_{VR} will decrease by the same amount, and vice versa; (3) a change in I_{L2} alone will cause no change in current through V_1 (because I_{VR} will change the same amount in the opposite direction); (4) since V_1 and V_2 are in series, the operating current range of the string is the same as for a single tube; (5) if both loads vary considerably, V_1 is the tube most likely to be overloaded and V_2 the one most likely to be pulled below the firing region.

When both loads are constant, the value of R is calculated as before. The only difference is that now $I_T = I_{L1} + I_{L2} + I_{VR}$. I_{VR} is again pegged at some reasonable minimum value. When both loads are varying, however, things get a little bit tricky. The formula for R remains the same, but care must be exercised to keep both tubes within their prescribed operating ranges. This is simply a matter of addition and subtraction of currents within the series string, based upon the points outlined above. Circuits will have to be tailored to fit the circumstances involved.

Another interesting feature of the series circuit is that a given number of v.r. tubes can produce more than that number of voltage combinations. Suppose, for example, that V_1 in fig. 2 is a VR105 and V_2 a VR75. Since the negative terminal of the power supply is the reference point for all voltage measurements, E_{r2} will be 75 volts and E_{r1} will be 180 volts. But if we reverse the position of the two tubes, E_{r2} becomes 105 volts, and E_{r1} remains 180 volts. The number of possible combinations increases as the number of different tube types in the series string increases.

Convenient though it is, the series v.r. circuit does have its limitations. For one thing, tubes cannot just be strung end to end indefinitely. The voltage drop across a single string must be sufficiently below the supply voltage to insure rapid firing and stable operation. Furthermore, load current drawn from any point in the string adds to that flowing through all of the v.r. tubes between that point and the supply. Therefore, if we employ more than two or three tubes and try to tap all of the available voltages, the permissable load at any single point will be

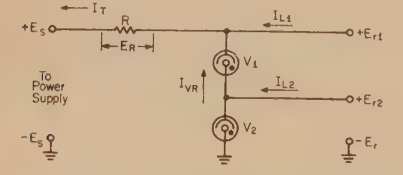


Fig. 2—When two v.r. tubes are connected in series, two regulated voltage outputs become available as explained in the text.

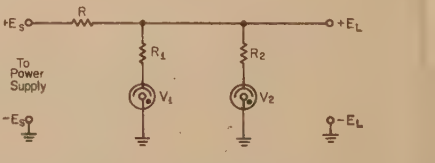


Fig. 3—If a regulated voltage is needed for a load that will vary more than the ratings of one tube, two similar tubes may be paralleled adding R_1 and R_2.

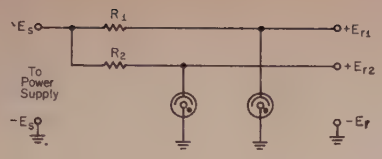


Fig. 4—Two or more v.r. tube circuits may be employed from a single supply, each one functioning separately.

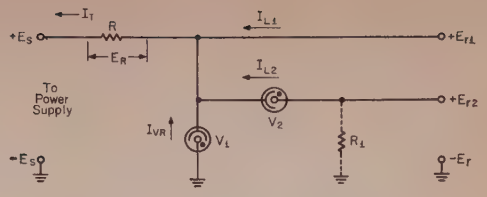


Fig. 5—When a regulated voltage is required below the rating of a standard v.r. tube, this scheme may be used. Resistor R_1 may be needed to keep V_2 ignited.

quite small indeed.

V.R. Tubes in Parallel

In theory, it should be possible to parallel two v.r. tubes of the same type, feed them from the same dropping resistor, and come up with twice the current handling capacity. Unfortunately, this just won't work. Slight differences in the individual tubes will invariably cause one to fire before the other. This immediately pulls the voltage at the end of the dropping resistor below the firing level, and the second tube remains dead.

A compromise solution to this problem is shown in fig. 3. R_1 and R_2 are resistors of from several hundred to perhaps a thousand ohms. They isolate the two v.r. tubes from each other sufficiently to permit both to fire. The system has two obvious drawbacks, however: (1) load voltage regulation leaves something to be desired; and (2) load voltage is somewhat higher than that at the plates of the v.r. tubes.

Multiple Series Strings

Where numerous regulated voltages and/or maximum current handling capabilities are required, the best approach by far is that shown in fig. 4. If necessary, additional branches may be added and each may contain several v.r. tubes in series. Each string functions independently of the others, and the operating characteristics of each are the same as for the circuits already described. Total load and v.r. currents must not exceed the power supply current rating.

Lower Regulated Voltages

Fig. 5 illustrates a means of obtaining regulated voltages lower than those which can be provided directly by any of the standard v.r. tubes. It involves nothing more than introducing a constant drop (another v.r. tube) between a load and an already regulated source.

Use of the circuit hinges upon three simple requirements: (1) V_2 must have a lower voltage rating than V_1 (the *difference* between the two is the desired output voltage); (2) the load connected to V_2 must be self-starting and of low enough impedance to maintain a current flow of at least 5 ma through the tube; and (3) I_{L2} must not exceed the maximum current rating of V_2. If the second condition is not satisfied by the load itself, a resistor of several thousand ohms, R_1, should be connected as shown in fig. 5 to induce the necessary current flow.

Once these requirements have been met, I_{L2} is simply part of the total load current so far as the dropping resistor and V_1 are concerned. Applying Ohm's Law again:

$$R = E_R/I_T$$

where $E_R = E_S - E_{r1}$ and $I_T = I_{VR} + I_{L1} + I_{L2}$.

Regulated Bias Supplies

V.r. tubes can also be used to stabilize negative bias supplies for transmitters, audio amplifiers, and other equipment. Arranged in the proper series or parallel combinations, they may provide anything from protective bias to fully regulated operating bias.

The simplest possibility is that shown in fig. 6. Note that here the grid current of the biased stage I_G, actually flows through the v.r. tube and is thereby limited to the maximum rating of the tube less the necessary 5 ma or so of ionizing current The bias supply itself, however, is only required to furnish this small amount, and R is adjusted accordingly:

$$R = E_R/I_{VR}$$

where $E_R = E_S - E_r$.

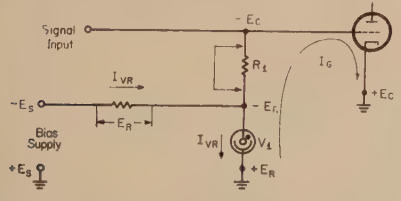


Fig. 6—A method of regulating the grid bias of an amplifier. A bias supply may provide either all or part of the needed voltage, the remainder being obtained from grid leak resistor R_1. See text.

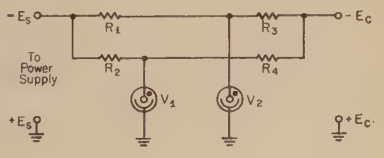


Fig. 7—If the grid current of an amplifier is greater than one v.r. tube can handle, two or more tubes can be paralleled using the method shown here.

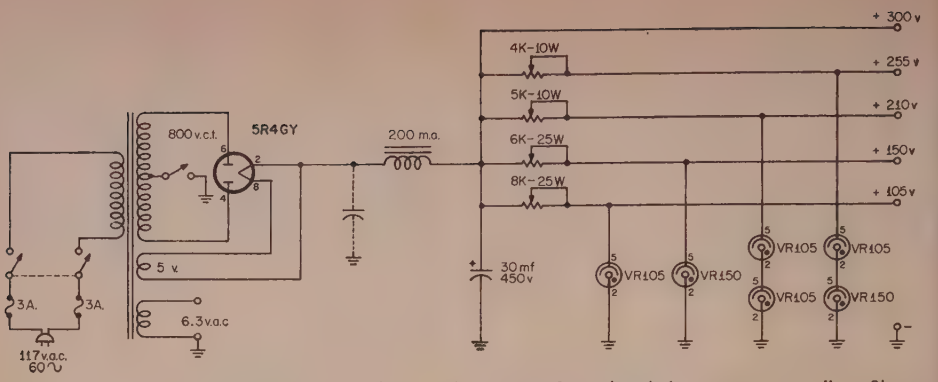


Fig. 8—The author's workbench supply provides a wide variety of regulated d.c. outputs as well as filament voltage. If the output voltage of the supply is less than 300 volts, the filter system may be changed to capacitor input by the addition of from 1 to 10 mf as shown. Add no more capacitance than necessary.

If V_1 is serving only as a source of protective bias, the remainder of the operating bias for some types of equipment can be derived from a grid leak resistor (R_1). This can be mounted within the supply as shown in fig. 6 or in the equipment itself. When using such a combination, remember that only the protective portion of the bias will be regulated; the drop across the grid leak will vary in direct proportion to the current flowing through it.

If full operating bias or higher protective bias is needed, additional v.r. tubes may be connected in series with V_1. Operating bias supplied entirely from v.r. tubes will, of course, be fully regulated. Supply requirements, grid current limitations, and the value of R are derived the same as for a single tube.

Paralleling v.r. tubes in bias supplies to increase current handling capacity is no more successful than in plate supplies. If we are primarily concerned with protective bias, however, the circuit of fig. 7 offers an easy solution to the problem.

V_1 and V_2 are tubes of the same type or represent series strings comprised of the same combinations. Again the dropping resistors, R_1 and R_2, are adjusted to permit approximately 5 ma of ionizing current to flow through each v.r. branch. R_3 and R_4 are equal in value and are chosen to make up the difference between the protective bias furnished by the v.r. tubes and the operating bias required by the amplifier stage. Since the amplifier grid current divides equally between the two v.r. branches, each of these resistors will be twice the value of the normal grid leak.

The result of this maneuver is that we now have twice the current handling capacity of a single v.r. string, we have a means of providing both protective and operating bias, and the two series resistors, R_3 and R_4, isolate the v.r. tubes from each other to permit proper firing. Primarily adaptable to class C transmitter stages, the system may be expanded to any required number of branches.

Workbench Supply

Fig. 8 shows the circuit of a workbench test supply used by the author. It provides filament voltage, four different regulated voltages, and the full unregulated output of the rectifier. The dropping resistors are adjusted to permit the rated 40 ma to flow through each v.r. string when no load is applied. This enables each string to handle up to 35 ma of load current (the other 5 ma is ionizing current).

There is nothing "sacred" about any of the components shown in the diagram. Different v.r. tubes may be substituted for those illustrated to give different output voltages. If this is done, simply readjust the appropriate dropping resistors to hold v.r. currents within maximum ratings (or apply sufficient load at all times to achieve the same end). The transformer should be capable of handling somewhere near the total current drain, but since most test work is of relatively short duration, it certainly doesn't have to be rated for continuous service.

Conclusions

Glow discharge regulator tubes are by no means perfect devices, nor do they represent the last word in regulation. Different tubes of the same type will exhibit slightly different voltage drops with the same series current. Furthermore, there will be slight changes in voltage drop as the load varies, particularly if it is swinging across the entire rated range of the v.r. tube.

By and large, however, they are fully satisfactory for regulation of low-powered equipment. Best results will be obtained when the load itself is light, when load variations are relatively small, and when the supply voltage is well above the firing voltage of the v.r. tube(s). For heavy duty applications, electronically regulated supplies are recommended. ■

A Space-Age Radio Amateur—ZE5JJ

H. E. SPAULDING*, W6BAF

Occasionally the Editors of CQ hear of an amateur who has made a significant contribution to the field of communications. When the amateur is overseas, the feat becomes particularly newsworthy. We hope that a small amount of publicity will in some way help compensate for tireless efforts and provide additional incentive for further accomplishments.

WE American amateurs may have overlooked the fact that our fraternal brothers overseas can make significant contributions to space-age technology. They do not have access to the many items which are commonly available in this country and most of their equipment is hand constructed with little more than tin shears, screwdriver, pliers and soldering iron. Even so, they more than make up for lack of equipment in industriousness and enthusiasm.

One such fellow is Peter Carey, ZE5JJ, of Salisbury, Southern Rhodesia. Peter, a ham just like you and I, is currently tracking several of our satellites and mailing tape recordings back to Dr. Van Allen at the University of Iowa. An analysis of the data contained on these tapes has led to a better understanding of the high energy radiation contained in the "Van Allen belt". In addition to receiving and recording the information, he is equipped to "command" a satellite on and off. Peter is the only amateur, to our knowledge, anywhere in the world who is entrusted with this responsibility.

Most of the equipment, with the exception of the recorder and receivers (used for variable i.f.'s) was constructed in Peter's shop after many hours of toil and much head scratching. Consider that he must build his own test equipment in order to check out the equipment he constructs! So far removed from sources of American parts and dollars, the construction of suitable equipment assumes overwhelming proportions.

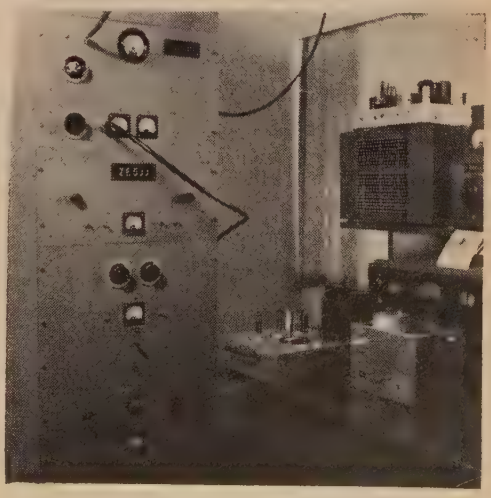
*3925 Osler St., Long Beach 8, Calif.

Peter started tracking satellites back in 1957. His interest was aroused when he read where hams would have no hope of hearing Explorer I's 10 milliwatt transmitter. In typical ham fashion this was taken as a challenge, which produced some rather crude v.h.f. converters. Crude or not, Explorer I *was* heard at ZE5JJ! This, of course, stimulated interest even more.

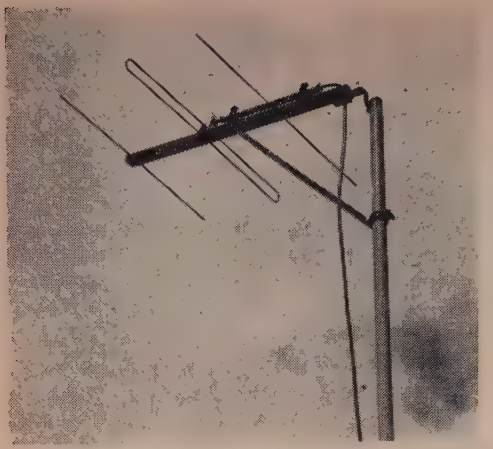
Many of his friends, such as Bob Carmody, ZE3JD and Gerry Wall, ZE2KV heard of Peter's work and became interested in tracking satellites. The competition between the three produced better and less noisy signals.

Eventually the team received Explorer IV with such excellent clarity, they offered the data that they had taped to Dr. Van Allen. Their help was graciously accepted and some 52,000 feet of tape was sent to Dr. Van Allen in 1958.

Having established their objective, the group felt sure they had something tangible to offer the International Geophysical Year program, which was well under way. They approached the Department of Federal Surveys with a request for a dual track recorder. Subsequently the Rhodesia State Lotteries donated 180 pounds (about $500) for an English Ferro-



Satellite command transmitter built by ZE5JJ under the direction of Dr. James Van Allen to turn on the Injun I satellite. At the left, on the table, is the exciter unit which drives a 5894 amplifier to 70 watts output. This amplifier, along with its a.m. modulator and power supplies is located in the rack at the left. The effective radiated power with a 3 element yagi is 350 watts.



The 3 element yagi for 136 mc used to command the Injun I satellite. The antenna is fixed in position and pointed to the acquisition bearing which is about 15° elevation. In spite of the small size of the antenna, the system has not yet failed to turn on the Injun's transmitter, usually on the first attempt.

graph Recorder which enabled them to make more accurate recordings of the satellite passes.

Later Peter was asked to help in tracking Explorer VII. For seven months Peter collected personally all of the data which was forwarded to the University of Iowa. So excellent was the information being received that a small contract was let to Peter to re-imburse him for his time which had been so generously provided. Early in 1961, Explorer VII was silenced after recording a total of 315,000 feet of tape.

In June of 1961, the Injun I experiment was injected into orbit along with the Transit 4A

View of the aiming controls of the 14 element, 136 mc telemetry antenna showing the remote S-meter used to "home-in" on transmitting satellites. Both azimuth and elevation are hand controlled.

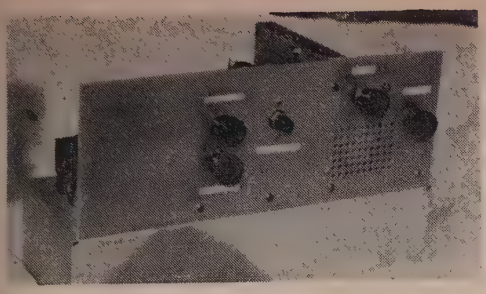
satellite. During the early part of the program all passes were commanded on and off in England and often the command receiver in the satellite did not respond. Peter suggested that he do his own commanding of the satellite and this suggestion was accepted. Up to the second month of 1962, commands issued from Peter's station have numbered 55, all of which have actuated the satellite properly. It might be well to point out that the command transmitter was also home made under the direction of Dr. Van Allen.

A question may come to mind—"Does this fellow work for a living? Or does he have means of income so that he can devote all of his time to this?" Peter is a working ham and puts in his 8 hours at the office and then tracks satellites on his "off hours." Peter is a graduate Electrical Engineer with a minor in Electronics and is presently an engineer with the Electrical Department in the city of Salisbury.

Standards clock at ZE5JJ is accurate to 1 second per month and provides impulses every second and every half minute. It is operated from a storage battery which is trickle-charged from the a.c. line. This clock is the stations "master" and drives a "slave" unit at the operating position.

What kind of equipment was used for a project such as this and what frequencies were used? With the exception of the early attempts, which were at 20 and 108 mc, all of the tracking has been done on 136 mc. The equipment used at ZE5JJ is shown in the accompanying photographs. From the pictures one can see that the construction methods are superb and would rival many of our commercial pieces of equipment. Early this year a 416B preamplifier, with a noise figure of 2 db, was completed. Another project underway, but not completed, is a parametric amplifier which should produce a 1 db noise figure. The 416B preamplifier will be used by one of the newer members of the team, ZE4JN.

[*Continued on page 90*]



Front view of a 220 mc r.f. section using a 24G/3C24 v.h.f. triode to drive a 5894 final to 60 watts input. Controls at left are 6146 plate tuning (top) and 24G grid tuning. To the right are the 24G plate tuning, 5894 loading and 5894 plate tuning.

A Simple, Stable 220 Mc Transmitter

HENRY H. BRUNDAGE*, KØHEI

This 220 mc rig runs about 60 watts input and uses a surplus 24G as a driver-tripler. The overall performance is excellent and it exhibits a high degree of stability.

As SERIOUS v.h.f. workers know, adequate drive for a 220 mc class C final in the 80 watt range is rather hard to come by. The usual procedure is to use the newer dual pentodes with the driver running straight-through at the desired frequency. In addition to the added circuit complexity, the tube is normally run at its maximum ratings, leaving little margin for safety. The writer needed a rig that would run for hours-on-end under key-down conditions for duplex operation. The rig described uses a 24G triode tripler-driver followed by the husky 5894. The 24G requires extra drive, of course, but the overall power requirements are about the same. Since no driver stage is running straight-through, a stable and easily adjusted rig results.

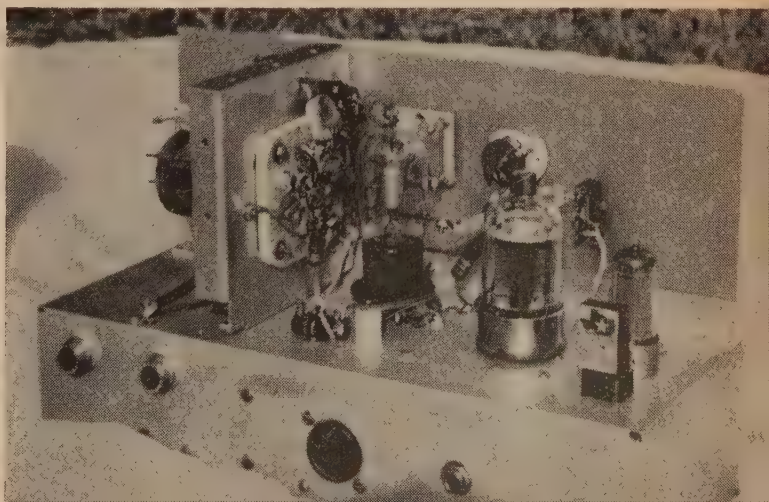
Construction

It is built on a 5 × 13 × 3 inch aluminum chassis. The 4¾ × 13 inch panel is secured to the chassis with ¾" angle stock. Originally it was planned to shield the entire enclosure, but this was found to be unnecessary. In some areas TVI may be more of a problem and this may be advisable.

All controls except L_1 are mounted on the front panel as shown in the photos. Meters may be mounted in the chassis if desired. Wiring is done in shielded lead as a TVI precaution. The antenna relay is mounted in the rear, but may be located externally if desired. The final stage is mounted horizontally on a 4¾ inch square aluminum bracket. The 24G socket is mounted on top of the chassis on ½" standoffs so the filament (cathode) return will be above the chassis. If shielding is decided upon it will be necessary to drill ventillation holes in the front panel and on the top and rear of the final tube.

The 5894 socket is positioned with the cath-

*8721 Booth, Kansas City 38, Missouri.



Rear view of this 220mc, 60 watt unit showing component layout. plate leads are ¼" copper strip, tinned and mechanically mounted to the tubes. No heat dissipating caps were used. Rear apron connections are: Antenna, Receiver, and Power Input. The key jack was installed later, as shown. The ceramic trimmer mounted on the 5894 socket is the neutralizing capacitor C_n.

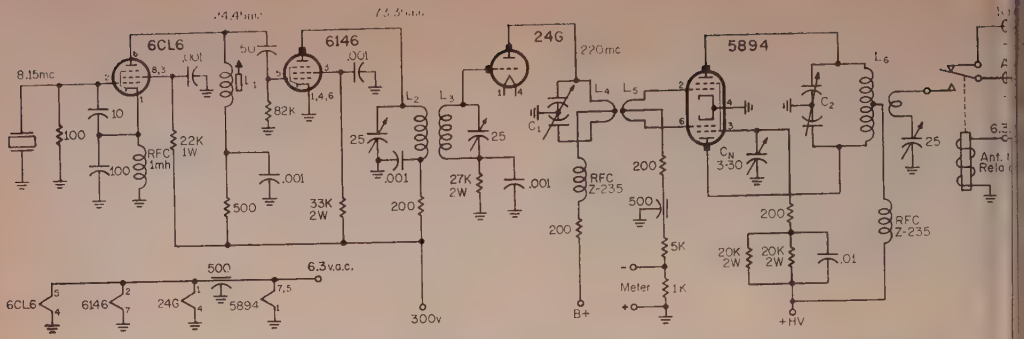


Fig. 1—Circuit of the 220 mc transmitter. The 25 mmf variables are of the APC type. All resistors are ½ watt, all capacitors less than one are in mf and greater than one in mmf unless otherwise noted.

C_1, C_2—1.5-5.0 mmf butterfly. Cardwell PL-6076.
L_1—12t #28E on ⅜" iron slug tuned form.
L_2—3t of B&W 3007.
L_3—4t of B&W 3007 spaced ½" from L_2.
L_4—Hairpin loop of #14, 2" long, ½" wide.
L_5—See text.
L_6—2t #14, 13/16" i.d., ⅜" wide with a 1 turn link, ¾" d. of #18 inserted in L_6.

ode pin closest to the panel. One end of a ½" copper strap is screwed to the bracket and the other end is soldered to the cathode lug using the shortest possible lead. The neutralizing capacitor is mounted between the screen lug and a soldering lug bolted to the bracket. The 200 ohm screen resistor and the 5000 ohm grid resistor with its bypass are also mounted on the bracket, their leads routed under the chassis.

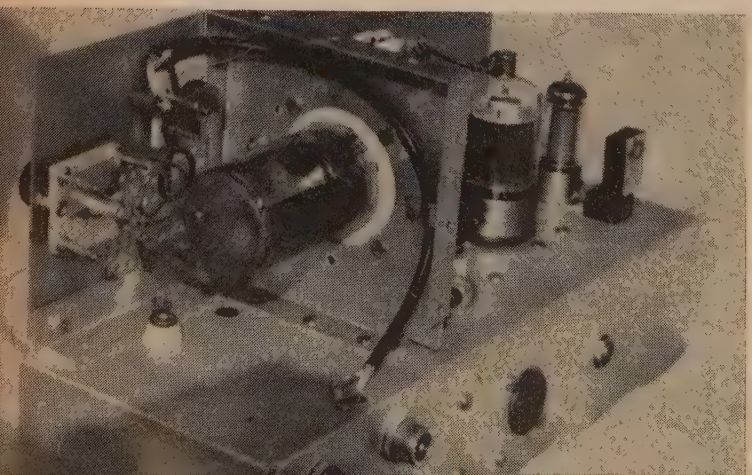
Since rather tight coupling is required between L_4 and L_5, a piece of 5 mil Mylar is slid between them to keep h.v. off the final grid. A good tube was ruined when a transient arced over, so it is advisable to take this precaution. The final grid coil, L_5, consists of a piece of #14 copper wire connecting the two grids with a ½ × ½ inch "bump" in the middle. This should be resonated at 22 mc with a grid dip meter before L_4 is secured in place. It will be necessary to have the final tube wired and its filament lit to do this, otherwise it may be pruned for maximum grid current after the rig is completed and the driver stage is operating.

Tuneup

Tuneup is very simple. The neutralizing capacitor, C_N, should be adjusted for minimum effect on the grid current (with no final plate voltage) when the final capacitor is tuned through resonance. Some additional adjustment may be required after the rig is placed in operation, but it is not extremely critical. When the rig is operating properly into a load, there should be a slight rise in grid current when the final is resonated. Tuneup should be carried out with about 250 volts throughout until proper operation is assured. The final may be operated over a rather wide range of plate voltages, depending on what's available in the way of a power supply. About 400 volts will do nicely. The driver is run at the same potential as the final, thus assuring adequate drive at the selected level. It should be possible to obtain 4 ma of grid current with 400 volts on the driver and final.

Keying is possible in a number of ways. Perhaps the best would be to key the cathode of the 6146 and use fixed bias on the 24G and 5894 grids.

The rig worked well right from the start and has been in regular operation with no erratic tendencies whatever. I would like to thank WØDDX for his helpful ideas and forebearance with on-the-air checks.



This view shows the r.f. amplifier section. Note the angle stock used to fasten the front panel and chassis. High voltage feed is accomplished via the ceramic feed-thru bushing.

The Instrument Deluxe

The Marriage of the Grid Dip Oscillator and the Impedance Bridge

BY DAVID T. GEISER*, WA2ANU

The discussion below covers an approach to the ideal instrumentation for the amateur station. While it is not perfect, this setup can perform tests necessary for the design, construction, tune-up and troubleshooting of amateur equipment. The unit combines the Knight-Kit Grid Dip Meter, Knight-Kit R.F. Z-Bridge and a homebrew control box that extends the versatility of both instruments. In addition to the construction data, the article presents a "familiarization course" describing the uses of the combined instruments that will be valuable for the newcomer and a refresher for many old timers.

THE versatility of the grid dip meter and impedance bridge individually and combined is really amazing. With a grid dip meter one can determine the resonant frequency of tuned circuits (in or out of equipment), determine unknown values of *C* and *L*, measure *Q*, tune and neutralize transmitters. The grid dipper (hereafter called the g.d.o.) can be used as an oscillating detector, a signal generator, a crystal oscillator and an absorption wavemeter. There are still other applications and uses described later in this article.

The impedance bridge can be used to adjust matching networks, adjust antennas to resonance, measure s.w.r. and impedance of antennas, to mention just a few. The flexibility of the impedance bridge is greatly enhanced when it is used with the g.d.o. as the signal source.

A control box designed and built specifically for combining the two instruments offers some interesting advantages. The impedance bridge requires a sensitive meter for indicating nulls. The g.d.o. meter is not sensitive enough for this purpose and so a two stage transistorized amplifier is included in the control box to increase the sensitivity of the meter. A further extension of the design permits the g.d.o. meter to be used as a voltmeter and milliammeter for general application in the shack.

Building the Kits

I had a good deal of fun building the g.d.o.; the whole unit took only two hours to construct and get percolating. I might add that I was surprised at how easily the parts soldered; good tinning, I believe, is as much a tribute to the manufacturer as to the assembler.

*Components Engineer, L.M.E. Department, General Electric Co., Utica, N.Y.

The impedance bridge was a joy to assemble. It doesn't take long enough for a young boy to get bored with it. A 72 ohm calibrating resistor is supplied with the kit and the calibrating procedure is effortless and foolproof.

Expanding Uses

An impedance bridge must have an r.f. input in order to operate. As previously indicated the g.d.o. is a most natural source for this signal. A second need for bridge operation is a sensitive meter to indicate balance. The meter does not have to be accurate, just sensitive. My first idea was to use the g.d.o. meter to indicate bridge output; unfortunately it wasn't sensitive enough. The 20,000 ohm per volt multimeter in the station worked fine but cost more than the g.d.o. and bridge combined.

The solution was found in the use of a direct coupled two stage transistor amplifier shown in fig. 1. When this amplifier is used as a null detector for the bridge, the bridge dial is is adjusted for *maximum* meter indication. The advantage of this is that the final indication is away from the zero on the meter scale. The meter scale zero has a heavy line and a printed "zero," and both are distracting when looking

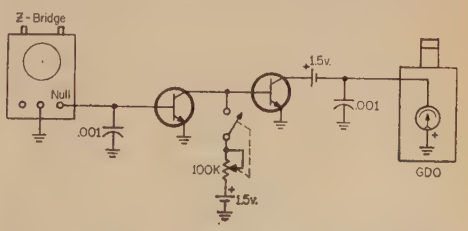


Fig. 1—Circuit of a simple transistorized amplifier used to increase the sensitivity of the Knight-Kit grid dip oscillator meter for use as the indicator with the Knight-Kit impedance bridge.

for the null. The amplifier gain control enables the final reading to be set anywhere on the meter face, away from a major mark.

The modification made on the g.d.o. is shown in fig. 2. It consists of nothing more than changing J_1, the phone jack, to make the internal meter accessible to an external circuit. The control box is wired so that, if desired, the phones may be plugged into the control box. The g.d.o., when operated alone, can still receive a pair of headphones with a normal 2 circuit plug.

Fig. 2—Modification of the Knight-Kit g.d.o. consists of replacing J_1 with a 3 circuit jack as shown. A Switchcraft #138 jack or equivalent is used.

Multimeter

While preparing this unit for publication, I was struck by how ridiculous the tiny amplifier looked all by itself in its 5" × 3" × 2⅛" minibox. After all, there was a 0-1 milliammeter connected to it, and "in the old days" all common multimeters used this basic unit.

Why not also make a wide-range milliammeter and voltmeter out of it? Then three small boxes (g.d.o., bridge, and control box) could perform practically all test and measurement functions around the shack except resistance and precision frequency measurement.

The Knight-Kit g.d.o. meter as purchased, has a 5% full-scale accuracy. This means that this maximum error (0.05 milliamperes on the 1 milliampere range) can occur anywhere on the scale—so if everything else is perfect, "low" readings may have considerable error. Certainly nothing in the bottom 10% of the scale can be depended upon. Thus it is desirable to have the ranges move upwards in steps no greater than 10:1.

Ammeter and voltmeter accuracy also depends on the accuracy of the shunts (parallel resistors) and multipliers (series resistors) used. Instrument makers require precision resistors, but ordinary ham projects rarely require an accuracy of even 20% in measurement, so 5% resistor accuracy is sufficient. One goal was set in the design; no "special" parts would be permitted. Every part in this equipment is a standard catalog item.

Ammeters and the Universal Shunt

The arrangement of fig. 3 shows what is called the universal shunt. Assuming a 1 milliampere

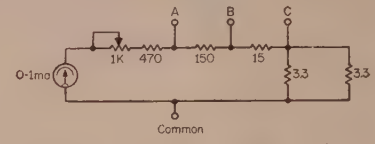


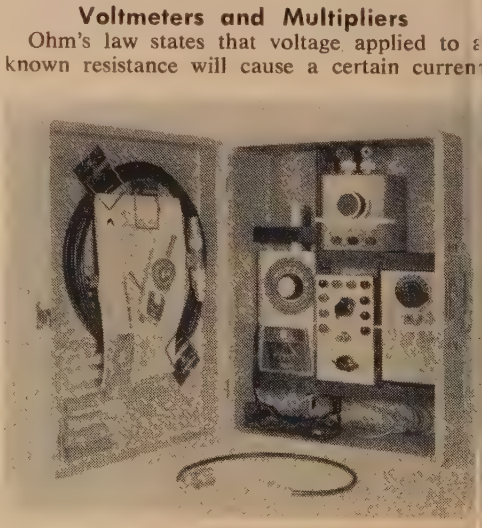
Fig. 3—Circuit of the shunt system used to convert the dipper meter to a multi-range milliammeter that can measure up to 1 ampere. The 1K pot is used for calibration.

(full-scale) meter and all current leaving the point marked "common," current inserted at point A will divide, with nine times as much going through the right-hand loop as to the left through the meter. The meter then acts with this connection, as a 0-10 ma meter. Inserting the current at point B gives 99:1 current division for 100 ma full scale, while point C gives one ampere full scale. Note that all resistances are standard values. An accidental (but perfectly logical) bonus of the particular values chosen is that tap A is also useful as a 1.5 volt full-scale voltmeter, fine for checking flashlight cells or other single-cell dry batteries.

The Knight-Kit g.d.o. meter has an internal resistance of 800 ohms. To accommodate other meters whose internal resistances might differ, a 1K calibration pot has been included. The procedure for correct adjustment will be discussed later. This pot, with a locking nut, is mounted on the front of the control box just above the FUNCTION switch.

Voltmeters and Multipliers

Ohm's law states that voltage applied to a known resistance will cause a certain current



View of all the units mounted in a carrying case. Holes cut in the partitions permit insertion and withdrawal of all plugs and coils without removal from the case. The unit on the right is a dummy load not described in the article. The carrying case top contains the g.d.o. coil case and the test leads. The coax length permits connection of the bridge to a load and includes a T adaptor. The T permits coupling into a male or female ended line and also, in most cases will permit connection of L or C components cross the load as described in the exercises. An SO-239 with 2 lengths of test and lead-wire connected to it, terminated in two alligator clips, permit simple connection of external components to the load when desired. The coupling link for use between the g.d.o. and the bridge is visible in the foreground.

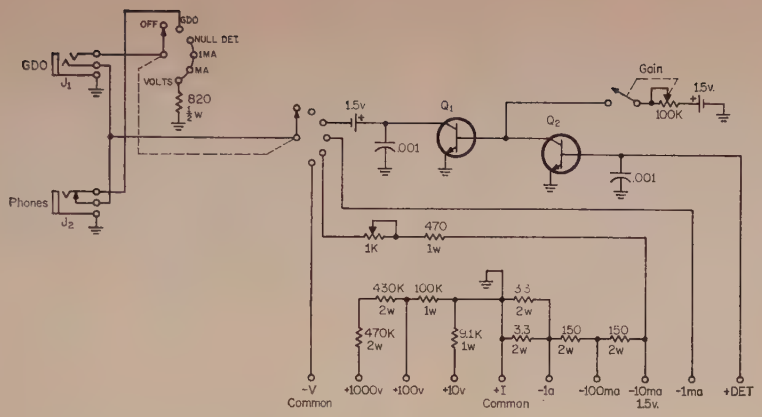


Fig. 4—Complete circuit of the control box that weds the g.d.o. and impedance bridge. The g.d.o. is connected to J_1 above by a simple 3 conductor cable with a 3 circuit plug on each end. Transistors Q_1 and Q_2 may be types 2N167, 2N357, 2N388 or 2N440. Switch S_1 is a Mallory 3226J or equivalent.

flow. To get full-scale deflection on our 1 ma meter, we must have 1000 times as many ohms as there are applied volts. This is the basis for the phrase "a 1000 ohms per volt voltmeter." Thus, for 10 volts full-scale, 10,000 ohms total series resistance is needed, 100 volts requires 100,000 ohms, and 1000 volts is limited to 1 ma by a megohm series resistance.

Here, again, the "standard parts" rule is followed. Aside from the 5% tolerance on the multiplier, a nominal 1% error is added on the 10 volt range by not deducting the 800 ohm meter resistance. A similar but smaller nominal error occurs on the 100 volt scale, with its 100,800 ohms instead of 100K. Percentage-wise, the error from this cause practically vanishes on the 1000 volt scale. Note that the error from meter accuracy still exists. It is not felt that the average ham cares enough to want to trim or select resistances when "ballpark" accuracy is sufficient.

Assembly and Calibration

The meter amplifier and its power supply are assembled in the bottom of the minibox, with shunts, multipliers, pots, terminals, and switch in the top (see photo). The layout is not critical, and the parts arrangement shown was only my opinion of a quick way to do the job. The complete schematic is shown in fig. 4.

Calibration of the ammeter is accomplished by connecting the 10 ma scale in series with a flashlight battery and a milliammeter known to be accurate in the 5 to 10 ma range. Adjust the calibration pot until the two meters read the same. The calibration is complete.

Marrying the Kits

The g.d.o. operates normally by itself with the new 3 circuit jack. Ordinary magnetic phones connected to a 2-circuit plug give normal headphone operation.

Make up a length of 3 conductor cable with a 3-circuit plug (Switch-craft #267) on each end to connect the g.d.o. to the control box. Insert the plugs into the 3-circuit jacks of the g.d.o. and control box. On switch position 1, everything is disabled. On position 2, normal g.d.o. operation is obtained; the headphones, if desired, may be plugged into the control box to use the g.d.o. as an oscillating detector, modulation monitor, or other audio-output device, but more about that later. Position 3 connects the amplifier to the meter (see next paragraph). Position 4 makes the 0-1 milliammeter available to the tip jacks, while position 5 makes it possible to measure currents up to one ampere. The last position (6) allows voltage measurement up to 1000 volts. The last three positions, 4, 5 and 6, are wholly self powered and it is recommended that the 115 volt line cord of the g.d.o. be unplugged when they are used.

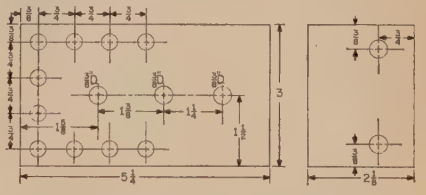


Fig. 5—Layout plan for the control box. Hole diameter for the pin jacks is determined by the diameter of the shoulder washers.

Position 3, you remember, sets up the transistor amplifier to increase the meter deflection sensitivity. The impedance bridge measurements are made by turning the bridge dial until there is zero output from the null terminals. As stated before, this gives *maximum* meter indication because of the phase-inverting characteristic of the amplifier used. The amplifier makes it possible to use the meter of the g.d.o. as the bridge detector and permits the use of a single pick-up link from the g.d.o. to use

it as a signal drive source over the range from 1.5 to 54 mc.

The pick-up link is constructed of 12 turns of 16 turns-per-inch ¾ inch diameter miniductor connected to a foot of RG-58A/U cable and a PL-259 plug with a UG-175/U adapter. The link easily slips over the g.d.o. coils, except the red 1.5-3.5 mc unit. The link connects to the bridge input terminal and the antenna or load to be tested connects to the "load" terminal. The link is normally positioned over each g.d.o. coil, except that it is as close as possible to the end of the red coil. When using the red coil for bridge drive, unplug it, insert the coil form through the pick-up link, and plug the red coil back into the g.d.o.

The *Z*-Bridge ground terminal connects to the control box COMMON jack and the bridge NULL terminal connects to the control box jack marked DET (for detector). With g.d.o. off, the GAIN (on control box) is advanced until the meter reads about 8. Turn on the g.d.o. and turn its gain up. Unless the bridge is pretty well balanced, the meter reading will drop toward zero. Adjust the impedance bridge dial to peak the reading. If the indication is not sharp enough when using the calibration resistor supplied with the *Z*-Bridge kit, advance the g.d.o. gain and check the position of the pick-up link coil. A bit of playing with the various gain controls and link positions may be desirable, though my set-up worked the first time.

It is handy, when making the null detector connections, to have a pair of leads with pin plugs on each end. While ordinary headphone tips are quite satisfactory, the insulation and "dressiness" of the insulated style (General Cement 33-106 and 33-108) plugs is good for voltage or current measurement safety and shack appearance. (Incidentally, while making voltage or current measurements, remember that the metal cases of these instruments are connected to one side of the measured circuit; so look but don't touch.)

Housing and Accessories

The g.d.o. bridge, and control box are fitted into a 15" × 11" × 5½" doll's suitcase with "handy hardware." This of course includes the g.d.o. coils, link assembly, and test lead but also includes a set of alignment tools, chunk of coax with connectors on both end a set of needlepoint test leads, an M-358 coaxial adaptor, two M-359 right-angle coaxia adaptors, an a.c. three-way plug adaptor, an *the instruction books*. A dummy load is at th extreme right of the case.

Wooden spacers painted with black sho polish (Dyanshine) and ¼" sewing elast hold the metal boxes in place. The other a cessories and instruction books are held i place in the top with cut down mouse traps.

Operating Exercises

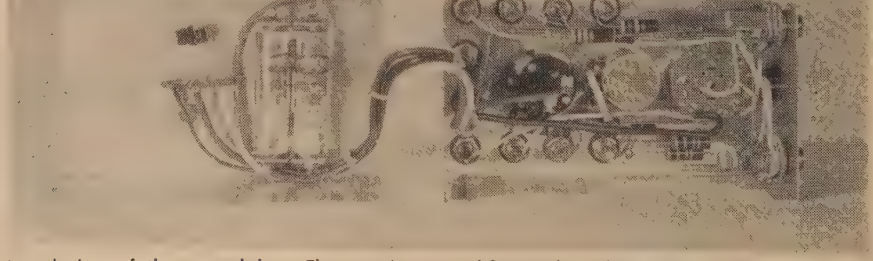
The editor of *CQ* has asked that the reade be given typical examples of actual use fo familiarization with the combination. Since th use of the voltmeter and ammeter combinatio have already been discussed, let's start wit the g.d.o.

EXERCISE #1. Build a parallel-tuned circu intended to operate somewhere in the shor wave bands. With either the modified or u modified g.d.o., locate the g.d.o. coil about 1 inch from, and in line with, the coil of th parallel-tuned circuit. Tune through the fu range of the g.d.o., noting the frequency frequencies at which the meter dips. Th lowest frequency at which a dip occurs close to the actual resonant frequency that ma be calculated by measuring the inductance ar capacitance. (The other indicated resonance if any, were caused by stray capacitance in th coil and inductance in the leads and capacitor Move the g.d.o. coil an inch or so farth away and re-dip the g.d.o. near the lowe resonant frequency. Note that the indicate frequency is different.[1]

EXERCISE #2. Move the g.d.o. coil arour the tank circuit, not touching the g.d.o. ga control, but re-dipping as necessary. Note th the depth of the dip decreases as the distanc

[*Continued on page 82*]

[1]Theory shows that it is not possible to tune tw coupled tanks to exactly the same frequency. The effe is most striking when the coupling is tight (physical close).



Internal view of the control box. The transistor amplifier and its batteries are mounted in the bottom of the case while the shunts, multipliers and controls are located in the top. All tip jacks are mounted with insulated shoulder washers to prevent shorting to the metal case.

DX DX DX DX DX DX DX DX

URBAN LE JEUNE, JR., W2DEC
BOX 35, HAZLET, NEW JERSEY

The following certificates were issued between the period from July 5th, 1962 to and including August 5th, 1962.

CW/PHONE WAZ

1705	W1KQF	Fred Taylor
1706	K5UYF	John C. Kanode
1707	W4SSU	Curtis George
1708	UC2AR	George M. Radion
1709	W5LCI	Jim Shaver
1710	W9JIP	Dave O. Thompson, Jr.
1711	ON4QJ	R. Billen
1712	K8IQQ	Joe Abraham
1713	GI4RY	R. Walsh
1714	K1JDN	Lt. Col. D. A. Bartol, Jr.
1715	W3LE	Louis C. Bremer
1716	SP9TA	Jerzy Sulikowski
1717	OK1VB	Bernat Vaclav
1718	ON4SB	Andre Schockeel

ALL-PHONE WAZ

161	W6BAF	Harold Spaulding
162	JA1BK	Kiyoshi Mizoguchi
163	W2UTH	Henry A. Blodgett
164	OE1FF	Frank Friedl
165	DL1FK	Richard Auerback
166	W3LE	Louis C Bremer
167	W6RCD	Win Goddard

TWO-WAY SSB WAZ

107	VQ2AT	Art W. Tuckfield
108	ZS5JM	John F. McCoy
109	K6LGF	Arthur L. Friedman
110	VE6TF	Albert Tuckey
111	ON4QX	Bob L. Th. Berge
112	W2UZF	J. G. Sadler
113	W1UOP	Roger C. Paulson
114	ZL3AB	Leslie Evans
115	W2UTH	Henry A. Blodgett
116	WA6EYP	John C. Papp
117	UA3FG	George V Zhomov
118	YO3GK	Cesar Pavelescu
119	DL1FK	Richard Auerback
120	HB9ZY	Gody Stalder

CW WPX

343	ON4QX	Bob L. Th. Berge
344	G2FFO	Richard Johnson
345	W2HUG	Philip J. Reich
346	K8ONV	S. Mary Ryden
347	VK2APK	Dietmar Kiesewetter
348	DJ2KS	Hans-Ulrich Widdel
349	DJ5IM	Ernst Beau
350	K6HOR	Robert N. Palmer
351	OK3UI	Milan Kesjar
352	F2MA	Andre Marcay
353	KP4AOO	Roger Burt
354	VK3XB	Ivor Stafford
355	W2ECU	Vernon D. Penner
356	W9DWQ	Edward A. Goodbout
357	K2YMO	John M. Ludutsky

PHONE WPX

73	DJ3OJ	Ing. Heinz Schneeberg
74	TG9AZ	Francisco Maza Castellanos
75	KP4WD	Luis Garcia de la Torre

SSB WPX

106	K8ONV	S. Mary Ryden
107	K2ZKU	Edward Gaudet
108	KP4AQQ	Osvaldo Garcia
109	WA2EOQ	Cornelius C. Unruh
110	W4NJF	Gay E. Milius
111	VQ2AT	Art W. Tuckfield
112	K1GHT	James M. Jacobs

MIXED WPX

38	W8TTN	Philip F. Krichbaum
39	W1UOP	Roger C. Paulson
40	WØVBQ	Oscar H. Baker

WPX ENDORSEMENTS

	Mode	*Total*	*Continent*	*Band*
ON4QX	CW		E-F-A	20
W2DGW	CW			80
W9IRH	CW			20
DL1VW	CW		E	
W7ABO	CW	367		
YU1AG	Mixed		A	
	Phone		E	
W9GFF	CW		E	
W3KDP	CW		E	
K2OUS	CW			20
K6VVA	CW	350		
WA2CBB	CW	350		
W1UOP	Phone		E	
W9WCE	CW		E	
K2ZKU	CW			20
W3AYS	CW	352		
G3FPK	CW		E	
G3JUL	CW		E	
W8KPL	CW		E	
F8PI	Phone		E	
DJ3HW	CW		E	

A-Asia; *E*-Europe; *F*-Africa; *N*-North America; *O*-Oceania; *S*-South America.

THE following item by Dale Strieter, W4DQS, appeared in the *Florida DX Report*. Its merit is so great that it is being reproduced in its entirety. After reading it, I'm sure most of us will find mistakes we make when sending cards to QSL managers. I know I did. Dale, as I'm sure you will remember, was one of the expeditioners on the recent KS4BF/HKØAB trip.

How Do You QSL?

As a neophyte in the ranks of the QSL managers, I can now marvel at the stamina and patience of individuals such as W2CTN, W3AYD, W4ECI, etc.

The recent expedition of HKØAB and KS4BF resulted in a QSO total of 9700 plus contacts with approximately 4500 QSL requests satisfied to date. In general, 95% of these requests were correct in the necessary QSL information, but the remaining 5% had errors which can be summarized as follows in order of common occurence.

1. Use of other than GMT. Not really an error but a big nuisance. In this particular case, all of these cards were returned with the request that they we re-submitted using GMT.

2. GMT date errors. Quite easy to spot in most

WPX HONOR ROLL

CW WPX

W2HMJ	668
K6CQM	565
W2EQS	562
W5KC	556
W8KPL	553
W9YSX	544
W6KG	542
W9UXO	542
W4OPM	531
W2HO	526
K9AGB	515
K9EAB	515
W1IJB	513
W1EQ	512
W6WO	511
W2GT	510
SM7MS	510
W8LY	506
W9DWQ	506
K2UKQ	505
G3EYN	503
W9GFF	503
YU1AG	503
W2NUT	502
W5LGG	502
W6YY	502
K2CPR	501
W9SFR	501
W2MUM	495
G2GM	488
SM5CCE	488
W8PQQ	481
W4HYW	478
W3OCU	466
K6SXA	464
K2ZKU	461
W9WCE	458
W3BCY	457
W4BYU	456
PAØLOU	451
W3PGB	450
DL1YA	450
W8JIN	449
W8RQ	445
OE1FF	442
W3BQA	437
W8UMR	429
K5LIA	428
OK1MB	428
W3CGS	426
W1EIO	425
SM5WI	425
WØPGI	420
HB9IT	419
OK3EA	419
W8IBY	416
WØMCX	416
W5AWT	412
W5DA	412
K5LZO	411
W2PTD	411
W4DKP	410
W1CKU	408
K4JVE	407
W5AFX	407
W2KIR	405
W4YWX	404
DL3RK	403
JA2JW	403
VE6VK	403
G3HIW	402
PY4OD	402
K2PFC	401
IT1TAI	401
VE3JZ	401
W2RA	400
VE4OX	400
VK3KB	400

PHONE WPX

W8WT	557
W9WHM	554
G3DO	538
CT1PK	483
W9YSQ	471
MP4BBW	454
PAØHBO	453
W6YY	448
VK6RU	421
F8PI	418
W9UZC	418
PZ1AX	413
G8KS	408
DL3TJ	404
W1UOP	402
OE1FF	382
TG9AD	381
DL6VM	376
PAØSNG	369
K9EAB	366
W8UMR	363
SM3EP	361
W5ERY	358
W8JIN	356
W9UZC	356
DL3TJ	354
PY2CK	354
5A5TO	353
LA5HE	351

SSB WPX

W4OPM	400
MP4BBW	392
IT2HP	356
W3MAC	354
K9EAB	350
PZ1AX	345
G8KS	341
W2HXG	324
W2VCZ	320
W8PQQ	315
HB9TL	315
G3DO	311
K4PUS	305
K1IXG	303
KØRDP	300
W6YMV	293
K2MGE	273
W1UOP	273
WØCVU	271
K2TDI	264
DJ3CP	260
VE3BKL	259
W2YBO	257
W3VSU	256
UR2AR	255
TG9AD	252
W4RLS	251
W1ORV	250
G3NUG	250

MIXED WPX

W8JIN	605
W4OPM	595
W3OCU	588
W8WT	583
G3DO	568
YU1AG	533
W9DWQ	508
K2ZKU	508
W8UMR	500

cases, but still entailed a delay in answering the request.

3. Failure to compute correctly the GMT time. This error points out the necessity of any serious DXer keeping a clock on GMT for log purposes in the shack.

4. Combination of 2 and 3. These were particularly troublesome.

5. Times off by as much as 10 minutes or more.

6. Dates off by as much as a month or more.

7. Times off by a factor of 12 hours.

8. Not in log.

9. QSL manager errors.

It would be generally conceded that it takes a certain amount of intelligence to pass the Radio Amateur examination, but since questions related to time keeping or calendar watching are not included, possibly these have no bearing on the mentality of the DXer. According to some individuals, we are wide open on this point anyway. However, even experience does not seem to be a factor since some well-known DXers who are on the Honor Roll even had time-/date errors on their cards.

Basically, the errors can be summed up as carelessness. Being human beings, we will all make errors but, certainly, we can eliminate or decrease the possibility if only to cut down on the work load of the QSL Manager.

Keeping the log in GMT and using a clock in the shack with GMT that is periodically set with WWV will be the only biggest item to improve the accuracy of QSL information. Being off by only 5 minutes means, in this case, glancing through as many as 20 call signs to locate the one desired.

As the QSL requests were numerous, it was necessary to adopt a certain procedure to facilitate reducing the work load. Those cards which could not be located immediately were put to one side for further research. After the backlog was eliminated, these cards were then processed in the following manner:

1. Checking the information as to correctness, *i.e.*, were we on that particular band at the time given?

2. A quick look one and two hours prior to time given. (The change to daylight time in some sections of the country caused many an error.)

3. One or two hours later than time given.

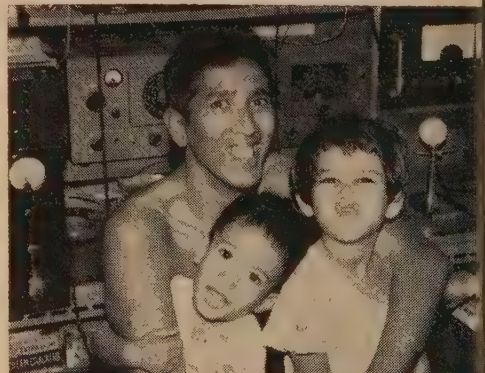
4. A look one day later and one day earlier with the same timing.

5. If still not found, tossed to one side or a request to the sender for further information. O

WAZ and WPX

THE WAZ and WPX certificates are awarded by the *CQ* DX department. WAZ is issued for proof of contact with the 40 Zones of the world as shown on the official WAZ Zone Map. WAZ is issued in three classes, *i.e.* Any mode, all phone and all s.s.b. For complete rules, see the January, 1962 *CQ*, page 50.

WPX is issued in four classes, *i.e.*, all c.w., all phone, all s.s.b. and Mixed. The number of prefixes required are: C.w.-300; Phone-300; s.s.b.-200; Mixed-400. For complete rules, see January, 1962 *CQ*, page 52. WAZ applications, Zone Maps and WPX applications may be obtained from the DX Editor at the address shown at the head of this column. Please send a self-addressed, stamped envelope or a self-addressed envelope and an IRC. All applications should be sent directly to the DX Editor.



Eshee, 9M2FK, and his two Jr. ops getting ready t put his station in operation from Penang, Malayc *(Tnx W6SFM).*

VQ1DR, Dave and VQ1YL, Mary, shown during their recent stay in Zanzibar. Dave signs W2GLM stateside. *(Tnx W2GLM).*

research is made in the log, entry by entry.

Of all the HKØAB requests, only two requests were not found. In the KS4BF requests, about a half dozen were not located.

To date five (5) cards have been returned to me for errors in calls or mode listing. It should be pointed out that at least a dozen of the cards put in the "Research Pile" were right where the information given stated they should be!

It took approximately four days (with the help of K4TEA, K4BVD, and a fellow engineer) to process approximately 2200 KS4BF cards and approximately eight days to eliminate the stack of cards that had errors. (Approx. 80-100 in number.)

In the future, I know that my QSL requests will be considered a little more carefully. To do the job correctly, the information should be double checked for correctness; your call sign should be given in *large type* on the *same side* as the QSO information; the s.a.s.e. should not be wrapped around the QSL card; the mode, time/date should be given on the *outer* envelope to facilitate sorting and means should be used to prevent the s.a.s.e. from becoming sealed before being used. Then be patient!

Let's keep W2CTN, W3KVQ, W3AYD, W4ECI, W8EWS, KV4AA, *et al* from becoming candidates for the straight-jacket set!

Without a question, one of the best known chaps in East Africa is VQ4GT and Lenny is shown here in Mombassa. The things crossing the street in the background are actually simulated elephant tusks made from aluminum. *(Tns W2GLM).*

While on the subject of QSLs, two additional tips were passed along by K2PFC and EL4YL. Duane, K2PFC, who is the QSL manager for quite a few DX stations mentions that many DX stations write stating that they are unable to get IRCs to pre-pay postage and Duane suggests that these stations send uncancelled stamps from their own country so that the managers may use these stamps to pre-pay postage coming from the opposite direction.

Traute, EL4YL, suggests that when sending letters and/or cards to foreign countries not to use flashy commemorative stamps as many times they are ripped off the envelopes and the contents are lost and that once having been ripped off, the letters are chucked into the circular file.

Sax, W2SAW, once mentioned that the best way of insuring delivery of packages which he sends for award purposes is to use Pitney Bowes stickers instead of stamps. If the person to whom you are sending the card is a stamp collector, a much better idea is to put these stamps on the inside of the envelope.

Here, There and Everywhere

AP5 East Pakistan:

The following letter is from Mohd, AP5CP, via K6BX. "You will be pleased to learn that not only have I operated my station, AP5CP, most successfully for one year now, but have assisted Zahid, AP5AH, Hassain, AP5JA and Khan, AP5SS in installing their stations at Jessore, Comilla, and Chittagong (all in East Pakistan) in the short span of three month's time, *i.e.* April, May and June, 1962 respectively. And now, in view of our increased activities and in the absence of any Club in Pakistan, we have agreed to form a club to be known as Tigers Amateur Radio Club. This club will come into being on Pakistan Independence Day, *i.e.* August 14, 1962. We have also decided to sponsor the following awards/contest on behalf of our club:

WAT-Worked All Tigers
WA-AP-Worked All Pakistan
APDZ-Pakistan Day Contest

"The Club will issue attractive certificates to those radio amateurs who submit proof of their claims as laid down in each award."

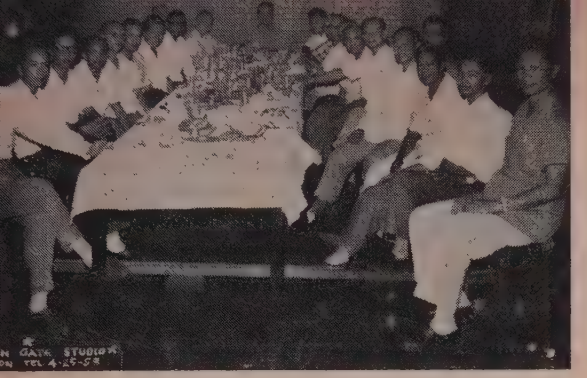
Detailed information for the awards listed above will be found in the Awards section of the column next month.

G? Rockall Island: A DXpedition is being planned by G3JZK. In a class with Malpelo Island, it is one of the most difficult spots in the world to operate from. Nothing but sheer cliffs all the way around. Landing is possible only by helicopter and even then, there is the danger of unexploded shells. It is sometimes used for target practice by the British. (*Tnx Fla. DX Report*).

JZØ Netherlands New Guinea: JZØML is presently very active on the low end of 14 mc c.w. from 1400 GMT. (*Tnx VERON*).

KG6 Mariana Is.: KG6CF and KG6RA (XYL) are active on 14 mc s.s.b. These two islands are counted as one country and are separate from Guam for DXCC purposes. (*Tnx VERON*).

MP4Q Qatar: MP4QBB, ex W5LAK/5A5TA, is QRV daily on 14020 or 14035 at 1900 GMT.



A recent meeting of the Philippine Association for Single Sideband of which W6FB, Col. Fred J. Elser, is the Tech. Adviser. This dinner meeting had for its guest speakers, Chief Administrator of NCDA, Alfredo Eugenio and Chief of the Radio Control Division, Bert San Andres. Almost all the DU-1 boys attended. From l. to r. ex-GZ, BG, LG, GE, MR, AA, EF, FR, Art, NCDA-Eugenio, RTI-Chairman, RCD-San Andres, OR, CE, Ex-DL, Ex-EL, EH, RS, FB, IK, Tom, PJ. *(Tnx DU1RTI).*

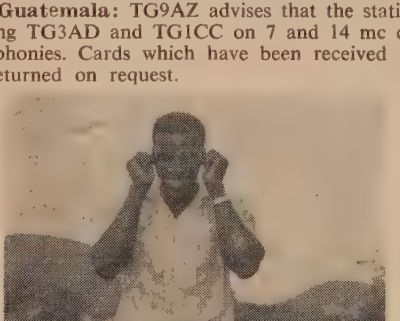
TA Turkey: The following is from K4WIS via the *Florida DX Report*:

"Mustafa, TA4RZ, has permission to operate from the Director of Communications although he has no license. I sent Bob White a letter along with a letter from Mustafa explaining the situation and asking if he will count TA4RZ QSLs. Licenses will be given out during this month (August). I am now receiving logs, but am sorry to say that all logs from the start of operation to the 23rd of June, were lost in Turkey. Will have to return some 60 plus QSLs. Mustafa says it won't happen again. Mustafa can run up to 700 watts input, Rx is a 75A-4 and the antenna is a whip.

"On July 8th, TA4RZ went QRT for a few weeks for political reasons. He expects to be back on the air soon. I will have QSL cards printed as soon as the ARRL says they will take them for DXCC. I would appreciate a small coin along with the QSL for Mustafa (a maximum of 10¢) to help compensate for the price of the QSLs. Thanks and it would be appreciated."

The above idea would be a good one for all QSL managers.

TG Guatemala: TG9AZ advises that the stations signing TG3AD and TG1CC on 7 and 14 mc c.w. are phonies. Cards which have been received will be returned on request.



Ken Jarvis, VP2KJ, shown here trying to scare away the QRM demon before turning 20 meters into an uproar. *(Tnx W4SSU).*

VK4 Willis Island: A trip is now being planned by several VKs who are in hopes of making a 21-day stand there. There are no licensing difficulties there and never has been, according to one of the VKs going. Everything is in order now except that the authorities do not want them to go unless they have provisions for getting back in case of an emergency. The trip is planned for sometime before the end of December with October and November being the poorest months for several months. They are also afraid that after all the plans are made, Danny may beat them there. Because of this, they are hoping to go before October. They have also discovered that a regular passenger boat goes there about once a month but the stay is limited to 36 hours. *(Tnx NEDXA).*

VP4 Trinidad: Trinidad amateurs are at a loss to account for some of the calls listed in recent DX columns or reported by overseas operators in subsequent QSOs. The latest call book lists all the licensed amateurs in Trinidad with the exception of VP4LD, omitted in error. No other VP4 calls are legal!

The Government of Trinidad and Tobago has authorized a commemorative QSL card marking this country's emergence as one of the newest independent nations. The card will be used by hams in the "land of the humming bird" beginning with Independence Day, August 31st, 1962.

The tragic crash of the Boeing 707 on a hillside in Guadeloupe, French West Indies, provides some of the most difficult traffic handling chores in a long time for members of the Antilles Emergency Weather Net. NCS KP4CGB at the US Coast Guard Base in Puerto Rico called in early, raising VP4NC and FG7XL. Later, VP3YG, FG7XE, VP2MC and VP2GAQ completed the net that carried first news and confirmation of the tragedy. FG7XL, Monique and OM Andre provided direct contact with the airport at Pointe-a-Pitre. Monique was still handling traffic six hours after the accident, despite the fact she, with many others on the island, lost close friends in the crash. French and English, c.w. and phone were used to speed the traffic. *(Tnx VP4NC).*

VR1 Gilbert, Ellice & Ocean Is: From Ralph, W1HGT, we learn that VR2DW is going to the Ellice Islands where he will sign VR1K. Current group representation is being provided by VR1G who is back on Ocean Island after a spell of leave. *(W1HGT via WGDXC).*

VR5 Tonga Island: Herb, VR5AA, has been very active lately, both on c.w. and s.s.b. Look for him on the very low end on c.w. and 14125 s.s.b. around 0600 GMT. *(Tnx VERON).*

VS4 Sarawak: The following letter is from VS4RM via the NCDXA: ". . . I am teaching here in Tanjong Lobang School for one year under the British scheme Voluntary Service Overseas (similar to the U. S. Peace Corps).

"The school here is what we call secondary grammar or 'high school' in the USA. It is co-ed with 300 children ranging from the 10-20 Chinese and Malay, and odds and ends from the various tribes including Dyaks, Kelabit, Murit, Konyak and Kayan. Quite a mixture and each has his own language! We teach here in English. I teach Math.

Travel here is easy if you have a passport or identity card. You can travel in two ways, by boat or on foot. Roads are few and far between and limited air transport is expensive, although I have a friend

who is a pilot for the Evangelical Mission and he has two small 'Piper' aircraft which are very f.b. I fix their radio gear from time to time.

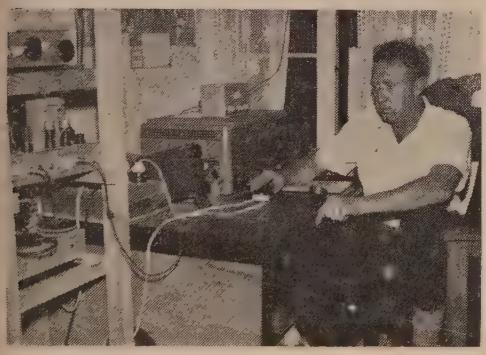
"Over Christmas I spent six weeks in the jungle, did about 250 miles on foot and 300 miles by canoe and launch. I got right up into the Indonesia border. We just wandered from village to village among the mountain districts up north Sarawak. It is pretty tough country-jungle swamps and stiff mountains. Some days we would go the whole day walking and never touch solid ground, just mud.

"The locals were headhunters but now are very civilized and friendly. I go back to the UK in September sometime, back to University in Scotland. My home call is G3OEF. I hope to go back via DU, VS6, Tokyo, and trans-Siberia to Moscow. Should be fun."

VS9 Kuria Maria Islands: W2KEZ/VS9 operated from the Kuria Maria Islands back around November, 1948. You old timers best check your files. If you have one send it in, it should be good for a new one. *(Tnx NEDXC).*

YI Iraq: OK1KX and OK1KW, better known as JT1AA and JT1YL are now in Iraq. They are trying to obtain operating permission and hope to be active soon.

G5KW has been active from YI es JY on 14310 s.s.b. around 0500-0700 GMT but has not been heard in the states as far as is known. He is worked frequently by MP4BBW and some of the other Europeans. *(Tnx NEDXA).*



Ivor, ZL1AGO, puts out a very fine signal from this rig on 15 meter phone and s.s.b. *(Tnx K5JCC).*

WØMLY/TJ8/TL8/TN8/TT8/TZ2, TY2MY & 5V4MY: Four months and eight countries have gone by since Dick, WØMLY, left the States on his Yasme Foundation-sponsored DX safari. To say that his trip was a success would be somewhat of an understatement. It would be impossible to make a meaningful estimate of the number of new countries and/or mode countries he dispensed other than to say that it must be astronomical. To Dick, then, a much deserved well done for a superb performance.

ZC6 Palestine: The following is from 4X4JU via the NCDXC: "You wrote me about SM5ZS/ZC6. Well, the ARRL DXCC Committee were very much correct, because this OM is not in the correct place to sign ZC6. I think I wrote you once telling about the U. N. Headquarters which is between the Israeli and Jordanian parts of Jerusalem, this place is ZC6. The SM5 station was located in Gaza (south west part of Israel and under the Egyptian administration). This place is only a couple of miles from

Pictured here is "Art," A. W. Tuckfield, VQ2AT, who added Northern Rhodesia to CHC's growing list of countries, now up to 70. Art, as the picture shows, uses an HT-32A to a KW-500 amplifier feeding a TH4 Thunderbird beam for one of the most potent signals coming out of Africa. Art is now up to 30 awards, some of which he displays in the picture along with his attractive XYL, Pat.

VE3BQL/SU, who is very active."

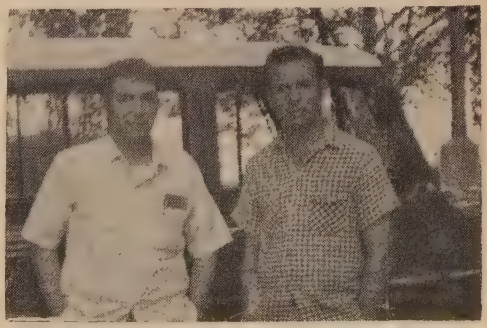
ZD6 Nyasaland: The following is from Mal, ZE3JO: "ZE3JJ (Ivan) and myself expect to be operating on all bands, phone and c.w., using a Viking Ranger from the Zomba Plateau, Zomba, Nyasaland, from the 13th to 20th of October, using the calls of ZD6JO and ZD6JJ. QSLs via RSSR Bureau. If we have two rigs, we will operate same time, if we do not QRM each other. The near similar callsigns will no doubt cause a bit of surprise."

ZL1 Kermadec Islands: Ex-ZL4JF (Campbell Is.) will be on from the Kermadecs using s.s.b. during October or November. *(Tnx ZL2GX).*

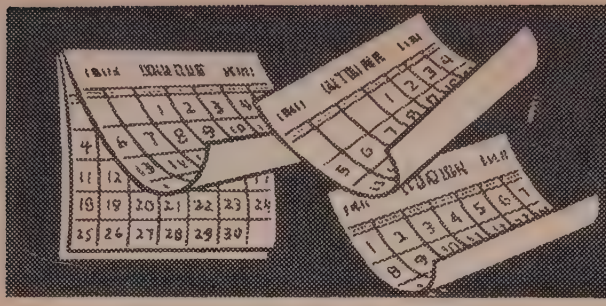
New England DXCC Dinner

The annual New England DXCC dinner meeting to be held Saturday, October 6th, 1962 at Motel 128, Dedham, Mass. This is the twelfth annual affair being open to all DXCC members and is sponsored by the New England DXCC members. Anyone interested in DX is invited.

[*Continued on page 92*]



Dave, VQ1DR, and Chuch, VQ1CJ, taken when they were both on Zanzibar recently. This picture was taken at 4:00 A.M. and it had already been light for an hour. *(Tnx W2GLM).*



CONTEST CALENDAR

FRANK ANZALONE, W1WY
14 Sherwood Road, Stamford, Conn.

CALENDAR of EVENTS

September	29-30	MARC VE/W
October	6- 7	Oceania DX Phone
October	13-14	Oceania DX C.W.
October	13-15	ARRL CD C.W.
October	20-22	ARRL CD Phone
October	24-25	YLRL C.W. Party
October	27-28	*CQ* WW DX Phone
October	27-28	RSGB 7 mc Phone
November	3- 4	RSGB 7 mc C.W.
November	7- 8	YLRL Phone Party
November	10-11	ARRL SS
November	17-18	ARRL SS
November	24-25	*CQ* WW DX C.W.
December	1- 2	RSGB 21/28 Phone
December	9th	OK DX C.W.

MARC VE/W

Starts 6:00 P.M. EST Saturday, September 29th.
Ends: 11:59 P.M. EST Sunday, September 30th.

Your logs go to John Varsaneux, VE2OC, 3020 Kirkland Ave., Mount Royal, Montreal, Quebec, Canada. They must reach the committee no later than November 5th.

Oceania DX

Phone

Starts: 1000 GMT Saturday, October 6th.
Ends: 1000 GMT Sunday, October 7th.

C.W.

Starts: 1000 GMT Saturday, October 13th.
Ends: 1000 GMT Sunday, October 14th.

There has been a change in the rules and format this year so be sure to check last month's CALENDAR. You can now work all other Oceania countries as well as VK and ZLs. And awards will also be given to top scores on individual bands.

RSGB 7 mc

Phone

Starts: 0600 GMT Saturday, October 27th.
Ends: 2400 GMT Sunday, October 28th.

C.W.

Starts: 0600 GMT Saturday, November 3rd.
Ends: 2400 GMT Sunday, November 4th.

It's the first time for this contest and it should prove to be a popular one now that activity on the higher bands has fallen off.

You will find it a bit confusing on the Phone week-end when the *CQ* WW DX Contest is also in full swing, but if you're real handy at bookkeeping you might be able to handle both of them at the same time.

Deadline for mailing your logs is November 19th. They go to the, R.S.G.B. Contest Committee, New Ruskin House, Little Russell Street, London, W.C.1, England.

YLRL Party

C.W.

Starts: 1700 GMT Wednesday, October 24th.
Ends: 2300 GMT Thursday, October 25th.

Phone

Starts: 1700 GMT Wednesday, November 7th.
Ends: 2300 GMT Thursday, November 8th.

This one is fully covered in Louisa Sando's YL COLUMN on page 80 this issue.

OK DX

Starts: 0000 GMT Sunday, December 9th.
Ends: 2400 GMT Sunday, December 9th.

We note that the contest has now been made to cover a 24 hour period. Formerly it was only 12 hours. However only 12 hours out of the 24 hour period can be applied for scoring purposes. Even this is a great improvement over the old regulations since now it is possible to make use of all the bands.

Full details next month.

"Say Frank, just how long do these ARRL DX Contests last?"

1962 CQ World Wide DX Contest

Phone

Starts: 0000 GMT Saturday, October 27th.
7:00 P.M. EST Friday, October 26th.
4:00 P.M. PST Friday, October 26th.

Ends: 2400 GMT Sunday, October 28th.
7:00 P.M. EST Sunday, October 28th.
4:00 P.M. PST Sunday, October 28th.

C. W.

Starts: 0000 GMT Sat., November 24th.
7:00 P.M. EST Fri., November 23rd.
4:00 P.M. PST Fri., November 23rd.

Ends: 2400 GMT Sun., November 25th.
7:00 P.M. EST Sun., November 25th.
4:00 P.M. PST Sun., November 25th.

CQ WW DX

Rules in full were covered on page 42 last month.

It might be well to once again review the four modifications covered under Section XIV.

1. Starting and ending time advanced 2 hours. This for the benefit of our overseas contestants.

2. Point value of contacts between North American stations has now been increased to 2 points. This is the most drastic change we have made in some years, and made with some misgivings on my part. As stated before it was made in an effort to stir up some activity in Central America and the Caribbean areas, and Canada too.

3. Reducing the minimum operating requirements on 21 and 28 mc from 12 to 8 hours was deemed advisable under present propagation conditions.

4. Making a Trophy again available after a lapse of 3 years should be an incentive to past winners.

There is still time to get contest forms to many areas, especially via AIR MAIL. Since we are now using a lighter grade of paper it will be possible to send 8 to 10 sheets and keep the weight within the one ounce limit. However we still require a large self-addressed envelope with the necessary postage, depending on your log requirements.

The address, same as you will be using for your contest reports. *CQ*, 300 West 43rd Street, New York 36, N. Y.

See you in the "pile-ups" the last week-end of the month.

73 for now, Frank, W1WY

A representation of the "Big Three" CQ, DARC and ARRL, at the s.s.b. dinner in New York a few months ago. L. to R. Hardi Ludwig, DJ3JZ, Urb LeJeune, W2DEC, yours truly, W1WY, Pete Morrow, W1VG and Lothar Woerner, DJ1BZ. (Why the fugitive look, Pete?)

Results 2nd Annual CHC/HTH Party
Continental Winners

CHC		*HTH*	
W5WZQ	88,960	K3CXX	29,340
SP6FZ	20,658	UA3UJ	10,629
VK5NQ	16,256	VK2APK	6633
JA2JW	8488	JA2WB	2883
CN8EV	6802		

Foreign Winners

CN8EV	6802	JA1CJN	1320	UB5CG	2871
DL9PF	20,584	OE2WB	1946	UT5CC	2208
DJ4OP	12,420	OH9PF	1132	UC2AR	5346
DL1QT	7000	PAØLOV	1932	UC2CS	3491
DL4FT	5928	PAØSNG	1593	UC2AA	2412
DL7BK	3162	SM5CCE	21,515	VE3LZ	12,592
DJ3HW	2835	SM5BPJ	4914	VE2iL	7912
EA4CR	1300	SM3TW	4050	VE3BWL	3375
F9IL	2756	SP6FZ	20,658	VE6ABV	2070
F9BB	1566	SP8MJ	9614	VE1OY	2025
G2FFO	8413	SP9DT	4950	VK5NQ	16,256
G5GH	5940	SP8YA	2376	VK2APK	6633
G3EYN	5285	UA3UJ	10,629	VK2PV	4968
G3JUL	4440	UA6LF	3556	VK4TY	1326
IT1AGA	6536			VO2NA	13,351
JA2JW	8488			YU1AG	19,239

USA Winners Only—CHC

Alabama				*North Carolina*	
K4HPR	20,068			K4MPE	14,950
Alaska		*Maryland*		*Ohio*	
KL7MF	7938	K3LXN	23,892	K8GHG	34,220
California		*Massachusetts*		*Oklahoma*	
WA6KNE	28,652	W1JYH	30,590	K4VTA	30,857
Colorado		*Michigan*		*Oregon*	
WØETT	15,134	W8KPL	35,805	K7IWD	7770
Florida		*Minnesota*		*Pennsylvania*	
W4FNQ	52,706	KØVTG	9528	W3OCU	24,768
Georgia		*Missouri*		*Tennessee*	
K4BAI	9240	WØMCX	27,816	W4YMG	4773
Hawaii		*Nevada*		*Texas*	
KH6DKA	27,690	W7VIU	7353	W5WZQ	88,960
Idaho		*New Hampshire*		*Vermont*	
W7BSP	9348	K1RTB	9552	W1FPS 1	4097
Illinois		*New Jersey*		*Virginia*	
W9UX	21,978	K2UKQ	13 452	W4ALJ	12,956
Indiana		*New Mexico*		*Washington*	
W9IU	42,600	W5LEF	6533	W7CNL	28 928
Kansas		*New York*		*West Virginia*	
WØVBQ	25,683	K2ZKU	26,393	W8UMR	10,965
Maine				*Wyoming*	
W1GKJ	33,228			WA2HXC/7	7866

USA Winners Only—HTH

Alabama		*Massachusetts*		*Ohio*	
WA4AWP	4324	W1KQF	8970	K8YCM	17,722
California		*Michigan*		*Oklahoma*	
WA6CRN	11,340	K8FDG	20,612	K5CWR	5568
Colorado		*Missouri*		*Oregon*	
KØVFY	5859	KØIFL	8295	W7FKF	6324
Connecticut		*Montana*		*Pennsylvania*	
W1WHQ	22,176	K7LTV	5856	K3RRA	15,150
Florida		*Nevada*		*Rhode Island*	
K4VFY	9396	K7KHA	7722	K1LOK	18,864
Illinois		*New Hampshire*		*Tennessee*	
W9QQG	16,758	K1PMY	4851	K4SQS	3024
Indiana		*New Jersey*		*Texas*	
W9FJX	6195	WA2DEC	5841	K5IWL	17 682
Kansas		*New Mexico*		*Washington*	
KØKCD	11,880	W5KLQ	17,415	W7IEV	10 560
Kentucky		*New York*		*West Virginia*	
K4HSB	1500	WA2JBV	12,672	W8BZY	4131
Maryland		*North Carolina*		*Wisconsin*	
K3CXX	29,340	W4EJP	20 060	W9JPC	5350
		North Dakota			
		KØIVQ	8316		

PROPAGATION

George Jacobs, W3ASK
11307 Clara St., Silver Spring, Md.

LAST MINUTE FORECAST

The following is a forecast of day-to-day propagation conditions expected during October, 1962. This forecast attempts to predict *specific* days upon which openings shown in the Propagation Charts in this column are most likely to occur, and the expected quality of the openings. For example, the following forecast shows that circuits rated (2) in the Propagation Charts are most likely to open with "good" quality (B) when conditions are above normal (Oct. 5-6 and 14) and with "fair-to-poor" quality (C-D) when conditions are expected to be normal. Circuits rated (2) are not expected to open on those days forecast to be "disturbed," etc.

PREDICTED PROPAGATION CONDITIONS & CIRCUIT QUALITY

Prop. Chart Forecast Rating	*Above Normal Days (WWV rating 7 or higher)* Oct. 5-6, 14	*Normal Days (WWV rating 5-6)* Oct. 3-4, 7-9, 12-13, 17-18, 20, 24-26, 30-31	*Below Normal Days (WWV rating 4)* Oct. 10-11, 15, 19, 21, 23, 27, 29	*Disturbed Days (WWV rating 3 or less)* Oct. 1-2 16, 22, 28
(1)	C	D-E	E	E
(2)	B-C	C-D	D	E
(3)	A-B	B-C	C-D	D-E
(4)	A	A-B	C	D

Where:

A—An excellent opening, with strong steady signals.

B—A good opening, moderately strong signals, with little fading and noise.

C—A fair opening, signals fluctuating between moderately strong and weak, with moderate fading and noise.

D—A poor opening, signals generally weak, with considerable fading and high noise level.

E—A very poor opening, or none at all.

CQ DX Contest Special

The 1962 *CQ* World Wide DX Contest will be held on the following dates:

Phone Section: 1900 EST (7 P.M.), Friday, October 26 to 1900 EST Sunday, October 28.

C.W. Section: 1900 EST (7 P.M.), Friday, November 23 to 1900 EST Sunday, November 25.

For more complete information and rules concerning the 1962 Contest see page 105 of August's *CQ*.

Sunspot Cycle

The Swiss Federal Observatory reports a monthly average sunspot number of 20 for July, 1962. This is the lowest level of monthly sunspot activity recorded since April, 1955. July's low sunspot activity results in a further decrease in the sunspot cycle, with the 12-month running smoothed sunspot number centered on January, 1962, dropping to 45. A smoothed sunspot number of approximately 30 is expected to occur during the 1962 Contest period. This will be the lowest level of sunspot activity since the Contest period of 1952.

General Forecast

Barring any radio storms developing during the Contest period (check the "Last Minute Forecast" at the beginning of this column), the following is a band-by-band summary of general propagation conditions likely to occur during the Phone and C.W. sections of the Contest:

10 Meters: The sunspot cycle has declined to the point where frequent 10 meter openings are not expected to occur, except perhaps, to some southern and tropical areas of the world. Unless conditions are "above normal", few, if any, openings are likely to Europe or the Far East. A few fairly good openings may occur to South Africa and South America during the daylight hours, and some openings may also be possible to Australia and the Pacific Island area during the late afternoon and early evening hours. On the average, however, 10 meters is expected to be poorer than last year, with DX openings to most areas generally few and far between.

15 Meters: Although DX openings are expected to be less frequent than last year, 15 meters should be the optimum band for DX during most of the daylight hours. The band is forecast to open to almost every corner of the world sometime during the period from shortly after dawn through the early evening hours. Signals from Europe and the north and east should peak about noon, while signals from the Far East and the south and west should peak during the late afteroon and the early evening hours.

20 Meters: Fairly good DX openings are expected to many areas of the world from sunrise through the early evening hours. Conditions on this band are expected to peak shortly after sunrise and again during the early evening hours. During these peak periods, 20 meters should be the best band for DX, with openings possible to many areas of the world, and with signal levels often exceptionally strong.

40 Meters: Conditions on this band are ex-

pected to be somewhat improved over last year. The band is expected to open for DX during the late afternoon hours, and remain open to one area of the world or another until shortly after sunrise. During the hours of darkness, 40 meters should be the optimum band for DX openings, with signal levels often exceptionally strong.

80 Meters: While generally not as good a nighttime band as 40 meters, some fairly good 80 meter openings are forecast to some areas of the world during the hours of darkness and the sunrise period. Conditions on this band are also expected to be somewhat better than last year.

160 Meters: Conditions on this band continue to improve as the sunspot cycle declines. DX openings to some areas of the world should be possible during the nighttime hours and the pre-dawn period. Because of low power limitations imposed in this band in many areas of the world, signals may often be weak and noisy, especially on phone.

[*Continued on page 94*]

CQ WW DX Contest Special

October & November, 1962

Time Zone: EST (24-Hour Time)

Eastern USA To:

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe	08-13 (1)* 07 08 (1) 08-11 (3) 11-13 (4) 13-14 (2) 14-16 (1)	06-07 (1) 07-11 (2) 11-13 (3) 13-15 (4) 15-17 (2) 17-19 (1)	15-17 (1) 17-18 (2) 18 23 (4) 23-01 (3) 01-03 (2) 03-05 (1)	18-20 (1) 20-23 (3) 23-01 (2) 01-03 (1) 20-00 (1)† 00-02 (2)† 02-03 (1)†
Eastern Europe & Eastern USSR	08-12 (1)* 07-08 (1) 08-11 (2) 11-13 (1)	06-07 (1) 07-10 (2) 10-16 (1)	17-03 (1)	19-01 (1) 21-01 (1)†
North Africa & Southern Europe	07-09 (1)* 09-11 (2)* 11-14 (1)* 06-07 (1) 07-11 (2) 11-13 (4) 13-14 (2) 14-17 (1)	06-07 (1) 07-12 (2) 12-14 (4) 14-16 (2) 16-22 (1)	15-17 (1) 17-18 (2) 18-19 (3) 19-23 (4) 23-01 (2) 01-03 (1)	17-19 (1) 19-21 (2) 21-23 (3) 23-00 (2) 00-01 (1) 20-00 (1)†
South Africa	07-09 (1)* 09 13 (2)* 13-16 (1)* 06-10 (1) 10-14 (2) 14-16 (3) 16-17 (2) 17-19 (1)	07-14 (1) 14-16 (2) 16-18 (3) 18-20 (2) 20-23 (1)	17-19 (1) 19-21 (2) 21-23 (1)	18-21 (1) 19-23 (1)†
Eastern Mediterranean	08-11 (1)* 07-09 (1) 09-11 (2) 11-14 (1)	07-10 (1) 10-14 (2) 14-20 (1)	19-00 (1)	20-23 (1)
Central Asia	07-11 (1) 18-20 (1)	06-07 (1) 07-09 (2) 09-11 (1) 18-21 (1)	17-20 (1) 05-07 (1)	*NIL*
Southeast Asia	11-15 (1)* 18-20 (1)* 09-10 (1) 10-12 (2) 12-15 (1) 18-20 (1)	06-07 (1) 07-09 (2) 09-15 (1) 18-21 (1)	17-20 (1) 05-07 (1)	*NIL*
Far East	17-18 (1) 18-19 (2) 19-20 (1)	06 07 (1) 07-09 (2) 09-10 (1) 17-22 (1)	05-09 (1)	*NIL*
Pacific Island & New Zealand	11-13 (1)* 13-17 (2)* 17-19 (1)* 07-16 (1) 16-20 (2) 20-22 (1)	18-20 (1) 20 02 (2) 02-07 (1) 07-09 (3) 09-11 (2) 11-14 (1)	00-03 (1) 03-07 (3) 07-09 (1)	03-04 (1) 04-07 (2) 07-08 (1) 05-07 (1)†
Australia	14-16 (1)* 16-19 (2)* 19-21 (1)* 08-09 (1) 09-11 (2) 11-17 (1) 17-20 (2) 20-22 (1)	18 01 (1) 01-05 (2) 05 07 (1) 07-09 (2) 09-15 (1)	02-04 (1) 04-07 (3) 07-09 (1)	04 05 (1) 05 07 (2) 07-08 (1) 05-07 (1)†
South America	07-08 (1)* 08-10 (2)* 10-14 (3)* 14-16 (2)* 16-20 (1)* 06-07 (1) 07-10 (3) 10-14 (2) 14-17 (4) 17-19 (2) 19-01 (1)	14-16 (2) 16-18 (3) 18-21 (4) 21-01 (3) 01-03 (2) 03-06 (1) 06-08 (2) 08-14 (1)	18-19 (1) 19-20 (2) 20 03 (3) 03-06 (1)	19-20 (1) 20 03 (2) 03-06 (1) 01-04 (1)†
McMurdo Sound Antarctica	07-09 (1)* 06-07 (1) 07-09 (2) 09-11 (1) 17-20 (1)	16-18 (1) 18-20 (2) 20 00 (3) 00 02 (2) 02-07 (1) 07-09 (2) 09-11 (1)	00-06 (1)	*NIL*

Time Zone: CST & MST (24-Hour Time)

Central USA To:

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe	08-12 (1)* 07-08 (1) 08-10 (2) 10-12 (3) 12-13 (2) 13-15 (1)	06-08 (1) 08-12 (2) 12-14 (3) 14-15 (2) 15-17 (1)	16-18 (1) 18-01 (2) 01-03 (1)	17-19 (1) 19-21 (2) 21-01 (1) 19-21 (1)†
Eastern Europe & European USSR	07 09 (1) 09-11 (2) 11-13 (1)	06-08 (1) 08-11 (2) 11-16 (1)	18-01 (1)	20-23 (1) 21-23 (1)†
North Arica & South ern Europe	07-09 (1)* 09-11 (2)* 11-13 (1)* 06-07 (1) 07-09 (2) 09-11 (3) 11-13 (2) 13-15 (1)	06-07 (1) 07-12 (2) 12-14 (3) 14-16 (2) 16-21 (1)	15-17 (1) 17-18 (2) 18-22 (3) 22-00 (2) 00-03 (1)	17-19 (1) 19-21 (2) 21-01 (1) 19-21 (1)†
Central Arica	07-09 (1)* 09-14 (2)* 14-17 (1)* 06-09 (1) 09-13 (2) 13-17 (3) 17-18 (2) 18-20 (1)	07-14 (1) 14-17 (2) 17-19 (3) 19-21 (2) 21-02 (1)	17-19 (1) 19-21 (2) 21-23 (1)	19-22 (1) 19-21 (1)†
Eastern Mediterranean	08-10 (1)* 07-08 (1) 08-10 (2) 10-12 (1)	06-08 (1) 08-11 (2) 11-18 (1)	19-23 (1)	20-22 (1)
Central Asia	07-10 (1) 18-21 (1)	06 07 (1) 07-09 (2) 09-11 (1) 17-19 (1) 19-21 (2) 21-22 (1)	05-08 (1) 17-19 (1)	*NIL*

* Predicted 10 meter openings, all others 15 meters.
† Predicted 160 meter openings, all others 80 meters.

South-east Asia	10-13 (1)* 17-19 (1)* 08-10 (1) 10-13 (2) 13-17 (1) 17-19 (2) 19-23 (1)	06-07 (1) 07-09 (2) 09-14 (1) 21-00 (1)	05-08 (1) 17-19 (1)	*NIL*
Far East	16-19 (1)* 15-16 (1) 16-20 (2) 20-21 (1)	06-07 (1) 07 09 (2) 09-11 (1) 16-19 (1) 19-21 (2) 21-22 (1)	03-09 (1)	04-07 (1)
Pacific Islands & New Zealand	11-13 (1)* 13-17 (2)* 17-20 (1)* 07-10 (1) 10-13 (2) 13-17 (1) 17-19 (3) 19-21 (2) 21-23 (1)	17-19 (1) 19-21 (2) 21-00 (3) 00 02 (2) 02 06 (1) 06-09 (2) 09-14 (1)	23-01 (1) 01 06 (3) 06 07 (2) 07-09 (1)	00 03 (1) 03-06 (2) 06 07 (1) 03-07 (1)†
Australia	08-15 (1)* 15 18 (2)* 18-21 (1)* 07-08 (1) 08-10 (2) 10-14 (1) 14 19 (2) 19-22 (1)	00-07 (1) 07-09 (3) 09-11 (2) 11-16 (1) 20-22 (1) 22-00 (2)	03-04 (1) 04-07 (3) 07 08 (2) 08-09 (1)	04 05 (1) 05-07 (2) 07-08 (1) 05-07 (1)†
South America	06 08 (1)* 08-10 (2)* 10 15 (3)* 15-17 (2)* 17-19 (1)* 05 07 (1) 07-10 (3) 10-14 (2) 14-17 (4) 17-19 (2) 19-00 (1)	14-17 (2) 17-20 (4) 20-00 (3) 00 02 (2) 02 05 (1) 05 07 (2) 07-14 (1)	18 19 (1) 19-20 (2) 20-03 (3) 03-06 (1)	19-20 (1) 20 22 (2) 22-00 (1) 00 02 (2) 02-06 (1) 00-04 (1)†
Mc-Murdo Sound, Antarctica	06-09 (1) 06 07 (1) 07-09 (2) 09-16 (1) 16-18 (2) 18-20 (1)	16 18 (1) 18-20 (2) 20 01 (3) 01-03 (2) 03 06 (1) 06-08 (2) 08-11 (1)	23-07 (1)	*NIL*

Time Zone: PST (24-Hour Time)

WESTERN USA To:

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe	07 09 (1)* 06 07 (1) 07-10 (2) 10-14 (1)	02 06 (1) 06 08 (2) 08-10 (1) 10 12 (2) 12-15 (1)	17-00 (1)	19-23 (1)
Eastern Europe & European USSR	07-11 (1)	06-07 (1) 07-09 (2) 09-15 (1) 23-01 (1)	20-00 (1)	20-23 (1)
Southern Europe & North Africa	07 10 (1)* 06-07 (1) 07-10 (2) 10-14 (1)	06-09 (1) 09-10 (2) 10-12 (3) 12-13 (2) 13-16 (1) 23 01 (1)	16-18 (1) 18-21 (2) 21-00 (1)	18-22 (1) 18-20 (1)†
Eastern Mediterranean	07-10 (1)	06 07 (1) 07-09 (2) 09-13 (1)	18-22 (1)	*NIL*
South Africa	06-08 (1)* 08 11 (2)* 11-14 (1)* 06-10 (1) 10 12 (2) 12-14 (3) 14 15 (2) 15 17 (1)	10-13 (1) 13-15 (2) 15-17 (3) 17-19 (2) 19-00 (1)	16-17 (1) 17-19 (2) 19-21 (1)	17-19 (1) 17-19 (1)†
Central Asia	07 09 (1) 17-19 (1)	07-09 (1) 16-18 (1) 18 20 (2) 20 22 (1)	06-09 (1)	*NIL*

South-east Asia	09-12 (1)* 15-16 (1)* 16-17 (2)* 17-19 (1)* 08 09 (1) 09 11 (3) 11-12 (2) 12-15 (1) 15 17 (2) 17-20 (1)	07-09 (1) 09-11 (2) 11-14 (1) 18-23 (1)	03 05 (1) 05-07 (2) 07-09 (1)	05-07 (1)
Far East	13-15 (1)* 15-17 (2)* 17-19 (1)* 12-14 (1) 14-17 (3) 17-19 (2) 19-21 (1)	07-12 (1) 12-14 (2) 14-17 (1) 17-19 (3) 19-21 (2) 21-23 (1)	22-00 (1) 00 02 (2) 02 06 (3) 06-08 (2) 08 09 (1)	23-01 (1) 01-05 (2) 05 07 (1) 01 06 (1)†
Pacific Islands & New Zealand	09-10 (1)* 10 15 (2)* 15 18 (3)* 18-19 (2)* 19-20 (1)* 08 09 (1) 09-12 (3) 12-16 (2) 16-19 (4) 19-20 (2) 20 22 (1)	06 08 (1) 08-10 (3) 10-12 (2) 12-17 (1) 17-19 (2) 19-22 (4) 22 00 (3) 00 02 (2) 02-04 (1)	21-22 (1) 22 05 (3) 05 07 (2) 07-09 (1)	22-00 (1) 00 05 (2) 05 07 (1) 02-06 (1)†
Australia	08 13 (1)* 13-18 (2)* 18 20 (1)* 07 08 (1) 08-13 (2) 13-17 (1) 17-20 (2) 20 22 (1)	06 08 (1) 08 10 (3) 10 12 (2) 12-20 (1) 20 23 (2) 23-04 (1)	01-03 (1) 03 06 (3) 06-09 (1)	03-07 (1) 04-07 (1)†
South America	06 08 (1)* 08-10 (2)* 10-13 (3)* 13-15 (2)* 15-18 (1)* 05-06 (1) 06 12 (2) 12-14 (3) 14-16 (4) 16-18 (2) 18-21 (1)	14-16 (2) 16-19 (4) 19-00 (3) 00 02 (2) 02-05 (1) 05 07 (2) 07-14 (1)	18-19 (1) 19 01 (3) 01-05 (1)	19 22 (1) 22 01 (2) 01 04 (1) 23-02 (1)†
Mc-Murdo Sound, Antarctica	07-09 (1)* 06-07 (1) 07-10 (2) 10-16 (1) 16-19 (2) 19-00 (1)	16-18 (1) 18 20 (2) 20 01 (3) 01 03 (2) 03-06 (1) 06 08 (2) 08-11 (1)	23-06 (1)	*NIL*

Forecast Ratings

The numerical ratings appearing in parenthesis following each predicted time of band opening indicate the *total* number of days during each month of the forecast period that the opening is expected to occur, as follows:

(1) Less than 7 days
(2) Between 8 and 13 days
(3) Between 14 and 22 days
(4) More than 22 days

For the *specific* days of each month on which a particular opening is most likely to occur, as well as a day-to-day forecast of reception conditions (signal quality, noise and fading levels), see the "Last Minute Forecast" which appears at the beginning of this column.

The CQ World Wide DX Contest Special Propagation Charts are based upon a double-sideband AM effective radiated power of 600 watts, a single-sideband ERP of 300 watts, and a CW ERP of 150 watts, at antenna radiation angles less than fifteen degrees. The Eastern UCA Chart can be used in the 1, 2, 3, 4 and 8 amateur call areas; the Central USA Chart in the 5, 9, and Ø areas, and the Western USA Chart in the 6 and 7 areas. The Charts are valid through November 30, 1962. Propagation information contained in these Charts is derived from basic ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

[Text of PROPAGATION is continued on page 94]

VHF

50mc. 144mc. 220mc. 420mc. and above

DONALD L. STONER, W6TNS
ALTA LOMA, CALIFORNIA

IF my correspondence pertaining to where do I buy this and that is any indication, the transistor receiver featured some time ago made quite a hit. Let's do it again, this time with a one-lunger lifted bodily from the *Technician* magazine.

The circuit is shown in fig. 1 and uses a single Philco 2N1728 which is sold by Lafayette Radio for only $1.23! Although the coil data is not given, an 8 turn coil on a ¼" form should hit six meters with the values shown. The link is one turn of hookup wire wound over the earphone-end of the coil, and is adjusted for best reception. The earphone is a 7,000 ohm type also sold by Lafayette, called a "super power dynamic earphone," catalog number MS-260 and $2.95. When working properly you will hear a loud hiss in the phone. The designer Lynn H. Wilke, WA2DAC of Peru, New York, reports excellent 20 mile reception.

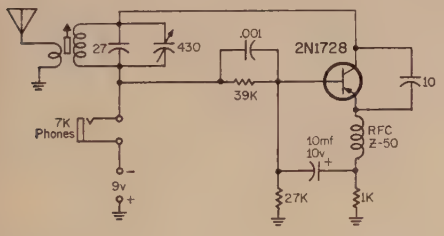


Fig. 1—Schematic of a very simple 50 mc transistorized receiver. Coil L_1 may be 8 turns of #18 e. ¼" dia. spaced to resonate the tank at 50 mc or any other suitable coil.

Have you ever noticed how much better signals sound when you cut the gain back on your communications receiver fed by a v.h.f. converter? Usually the reason is the high output of the converter. The converter manufacturer cannot know what type of receiver the device will be used with and he must therefore provide sufficient gain for the sluggish inhalers without overloading the sensitive ones. Amateur radio W4OAB has come up with a slick gadget to pad down the gain of high output converters. His i.f. attenuator, shown in fig. 2, is connected between the receiver and converter and should be used with any converter which causes your S-meter to rise above S3 on noise. Several degrees of attenuation are provided to permit selection of the best conditions for a particular installation. It should be pointed out that the pad will also reduce spurious signal feedthrough from the converter. Thanks go to the Carolina VHF Society publication *The Ragchewer* for this tasty technical tidbit.

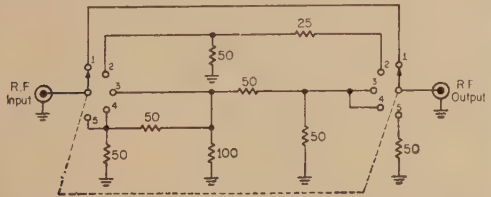


Fig. 2—I.f. attenuator for use between the station receiver and a v.h.f. converter to pad down the output of many high-gain converters.

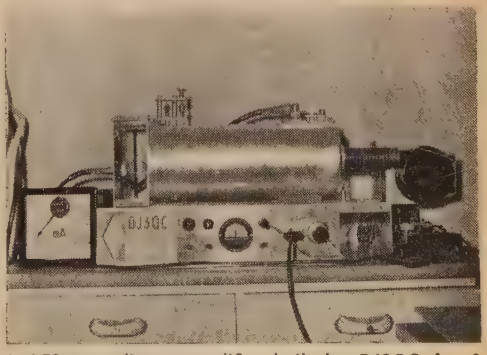
Sideband on Two

Those lucky enough to have purchased the Barry Electronics 240 mc beacon transmitter ($14.95) have a beautiful foundation unit for a 2 meter s.s.b. mixer which can be used with the small exciter featured last month.

The conversion circuit was developed by a local amateur, Ralph Meinhardt, K6BUK, and integrated into a complete two meter s.s.b. converter. His unit includes the circuit shown in fig. 3 (which is also the conversion circuit for the Barry rig mentioned earlier) to convert 14 mc s.s.b. to 144 mc and a linear amplifier using a 5894, in addition to a low-noise Nuvistor converter.

Next month's column will contain conversion details of the beacon transmitter plus info on converting the ARC-5 transmitter to a two meter s.s.b. mixer.

The K6BUK circuit (fig. 3) uses a 43.333 mc xtal in an overtone oscillator circuit. Coil L_1 is resonated with the tube and stray capacitances. Note that the B+ line is regulated. The r.f. output drives a tripler with the output circuit resonated at 130 mc. Drive from this section feeds the mixer, a 12BY7 operating with the screen at d.c. ground potential. R.f. is fed into a coil broadly resonated at 14 mc through a three turn link winding. This circuit is not critical and any coil capacitor combination which resonates at the drive frequency may be used. The 14 mc input circuit includes an attenuator made up of twenty 1000 ohm 2 watt resistors connected in parallel to provide a noninductive load of 50 ohms and 40 watts dissipation. This permits operation with exciters in the 100 watt class. The series capacitor is adjusted to



A 250 watt linear amplifier built by DJ3QC for 2 meters. A 4X150D is used with a cavity resonator.

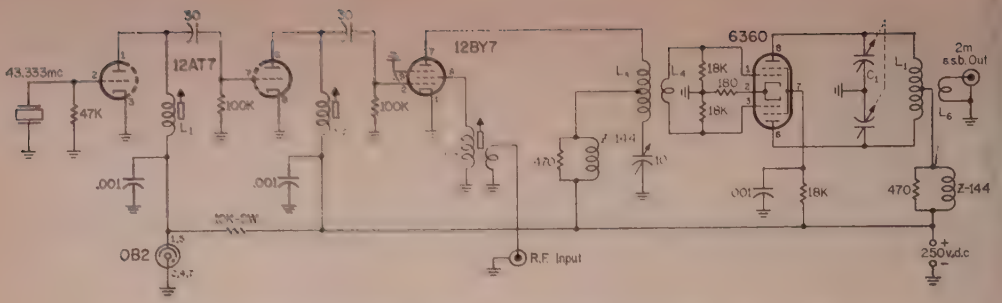


Fig. 3—A not-too-complicated conversion of the 240 mc beacon transmitter sold by Barry Electronics for use as a two meter sideband heterodyning unit

C_1—5mmf butterfly capacitor. Johnson 5MB11.
L_1—16 t. #28 ¼" dia. closewound.
L_2—3½ t. #22 ¼" dia. Resonate with tube capacitance at 130 mc.
L_3, L_5—4 t. Airdux #3002.
L_4—2 t. link of hookup wire.
L_6—1 t. link of hookup wire.

provide the correct drive when the low frequency exciter is being used in a normal manner. R.f. output from the "VHF Quacker" featured last month can be used to drive the s.s.b. converter by feeding the output of the Pi-network directly into the link winding on the screen coil. The output of the 12BY7 is a lumped constant ½ wave line with link coupling to the 6360 linear power amplifier. This stage operates class A with the grid bias determined by the value of cathode resistor. The final tank is push-pull tuned with a Johnson butterfly capacitor. Note that both driver and final tanks are voltage fed through Ohmite Z-144 chokes. These chokes are shunted by 470 ohm resistors to damp out any spurious resonances.

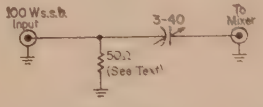


Fig. 4—R.f. power attenuator for use between s.s.b. exciters for the 100w. power class and the s.s.b. converter of fig. 3.

The frequency of L_1 and L_2 should be checked with a grid dipper and adjusted for maximum voltage across the grid resistor of the 12BY7 (make this check with a v.t.v.m.). The driver plate tank tuning adjustment (10 mmf) and link are set for maximum plate current with carrier inserted in the exciter. The final output circuit should be adjusted for maximum transmission line current or linear amplifier drive as the case may be.

The output of this unit is about 10 watts PEP which can be fed directly into an antenna or used to drive a high power linear amplifier. K6BUK used the exciter portion "barefoot" and has reported working all over Southern California. This same performance can be expected when converting the beacon transmitter to conform with fig. 3.

The circuit for Ralph's linear is shown in fig. 5 and he readily admits the design was "borrowed" from the Hallicrafters Transverter. The input circuit is broadly resonant at two meters with the tube grid capacitance. The negative 26 volt bias is fed to the tube grids through a 470 ohm resistor which acts as an r.f. choke. Two 4700 ohm resistors shunt the coil to provide broad bandwidth and grid swamping. The output tank consists of ½ inch line constructed as shown in figure 5. Tuning and loading the linear is the same as any a.m. rig simply by inserting carrier in the exciter. The linear should be loaded for maximum antenna current to obtain the greatest output consistent with good quality.

VHF Around the World

Hans Dohlus, DJ3QC, 852 Erlangen Germany, Gleiwitzerstrasse 45, writes to tell us of a new magazine *UKW-Berichte* (*VHF Reports*) published by OM Pendl, OE6AP who is v.h.f. manager of the Austrian Experimental Transmitter Association. Construction descriptions, technical reports and information for the v.h.f. and u.h.f. amateur should make for interesting reading. Although the text is in Austrian, the schematics can be readily understood by anyone. Hans estimates the price will be about $2.50 annually and further states that their group is interested in exchanging the magazine *UKW-Berichte* (*VHF Reports*) published photograph of his 250 watt, 145 mc cavity resonator power amplifier using the 4X150D, which is reproduced hereabouts.

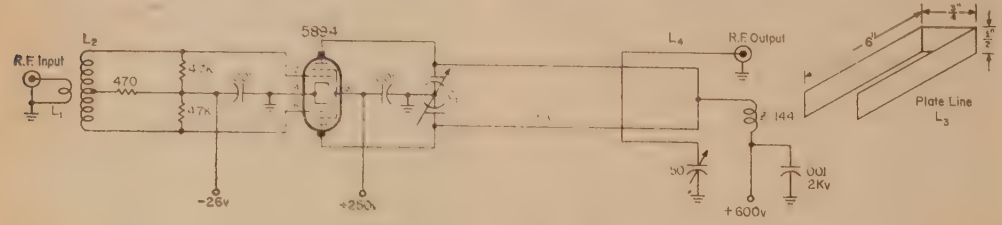
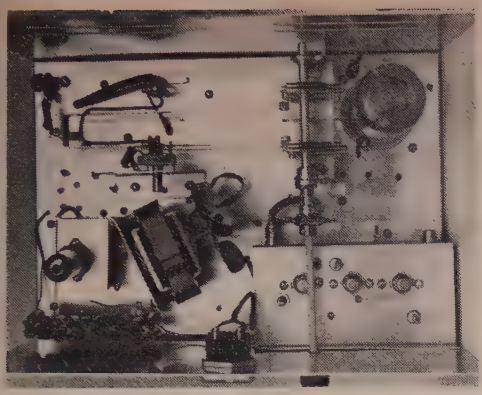


Fig. 5—Linear amplifier for the K6BUK s.s.b. converter. Capacitor C_1 is a 5 mmf butterfly type, Johnson 5MB11.

L_1—1 t. hookup wire around center of L_2.
L_2—3 t. Air-Dux #3002.
L_3—12¾" × ½" copper strip. Bend as shown.
L_4—Hairpin loop of hookup wire, 2" l. × ¾" w.



Above chassis view of K6BUK's 2 meter sideband trans-verter. showing the layout of the 5894 linear amplifier plate circuit. The power attenuator for higher-power drivers can be seen at the lower left with the 3-Nuvistor 2 meter converter at the right.

Dr. Karl Gerhard Lickfeld, DL3FM, of the famous Deutscher Amateur Radio Club, writes an interesting letter to say that the DLØSZ gang in Munich has done a remarkable job to promote the 433 mc activity, particularly in the southern part of Germany. The converter shown some time ago in *CQ* has been built by many u.h.f. enthusiasts. Recently, a commercially made 433 mc converter (based on unit built by Dr. Lickfeld in 1959) has appeared in the German market. A g.g. r.f. amplifier uses a pi-filter in the cathode. It and the other r.f. circuits are made of coaxial elements. A triode is used in the mixer stage with oscillator injection in the cathode circuit. Between the last stage of the oscillator, which is tuned to 405 mc and the mixer, a selective coaxial filter is used to reject unwanted oscillator products thus improving the noise figure and spurious rejection. A noise figure of 6 db is guaranteed. Looks like a product which would find wide acceptance in this country!

VHF Around the States

Let's start our tour by taking a buzz down to the Carolinas to pick up the latest. Word has it that double-E hops have been terrific from that area into California and the western states. Even the Communicator crowd has been getting into the act! WA4AET has been very active during these periods, along with gung-ho W4ULE who worked CO2ND through the cane curtain. K4SNF reports hearing a W8 working KH6 land on July 5. XE stations were bombing in a few days before. W4ULE also worked W4MBB in Florida for 1¼ hours on the 1st of July, following this by picking up a flock of Iowa stations, including KØHRQ/mobile on the 3rd. Between the 3rd and 12th, every thing to the coast was heard and worked, with CO6FB, CO3NR and XE1CT as the ones who got away. For DX'ing Mac recommends "Don't play turtle! Try calling CQ. You might start something. Don't wait for something to happen, make it happen! There may be 30 guys sitting there just twisting the dial. If you're on, those skip stations will hear you first and break in."

On two meters, W4BUZ advises us that history was made recently by K4MHS of Salisbury, N. C. On June 29 he worked a three-way with W3IBH in Penna. and K2BNK in N. J. Everybody was hearing everyone else too! Also W4BUZ worked K2IEJ in Oceanside, L. I., N. Y. with only 12 watts and received an RST 579 on the 28th of June.

North Carolina Technicians are "shook" during these openings because the Yankees don't tune up to 145 mc. There are many northern stations who need North Carolina and vice versa so let's take advantage of any opportunity to use the maximum amount of the band when the conditions are right. So says W4BUZ who has completed his kw for two meters and is completing a converter for s.s.b. operation. The rig uses a pair of 4X250B's and seems to be extremely efficient. K4GPL, Ronald, reports it puts out about 800 watts on c.w. (Gads—how about a schematic and layout?). Ron is also building a similar gallon and should have it on the air by now. K4GPL also reports that the band was open late in July with 10 states heard. Ron is also in the Technician boat and misses out on the DX because of lack of tuning above 145 mc. He operates on 145.008 c.w. or a.m. You Yankees keep an ear pealed for Ron, you hear?

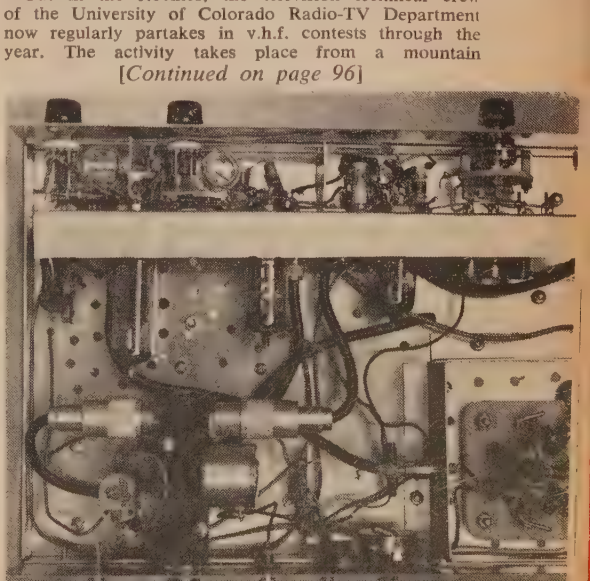
Looking for u.h.f. skeds? WA4ASH will go 2, 3, 5 and 10 Gc. if he can find a second party. He has most of the parts and only needs encouragement and someone to work with. Roger also wants data on the CRV-MAR gear and needs 4X150 sockets.

Before swinging north of the MD line, let's see whats cooking in Missileville. Catherine White, K4TBG, 121 So. "L" St. Lake Worth, Fla., writes to tell about working 41 states including everything but five states in 7-land. Kay reports hearing KL7AUV on July 5 at 1225 A.M. No hula skirt stuff, though. Total contacts include 745 stations since the 28th of April, this year. Kay continues "Have received cards from 442 and getting them in everyday. I only work in the day time and let the boys have it at night. I love 6 meters very much. Also work 2 meters but not as well except for traffic. Skip has been good here in Florida."

From up Maryland way, Stan Brigham, W3TFA, writes to comment about his converted URC-4. He says the results have been amazing with distances covered up to 55 miles while operating inside his attic. Stan carries it with him on business trips, and would like to convert one for 50 and 220 mc. If anyone has dope on such a conversion, drop him a line at 7211—16th Ave., Takoma Park 12, Md. Stan continues "144 mc has been exhibiting its June display of tropo and conditions on June 28 were good from the inland part of N. Carolina north along the New England coast to Mass. Worked W4MKT, Winston Salem, N. C., 255 miles and W4VHH, Charlotte, for 330 miles. The rig is only 15 watts input to a 522 with a 12 element yagi which has provided me with 13 states 5 call areas and 420 miles of DX. 50 mc has displayed frequent sporadic-E conditions since 29 April and my 7 watts input to a 2E26 final with an inside dipole have weaned me 25 states."

Out in the Rockies, the television technical crew of the University of Colorado Radio-TV Department now regularly partakes in v.h.f. contests through the year. The activity takes place from a mountain

[*Continued on page 96*]



Under chassis layout view of the K6BUK s.s.b. transverter. Note particularly the position of the tube sockets to the tuning control which provides minimum lead length. The heart of the unit is the v.h.f. beacon transmitter available from Barry Electronics.

ham clinic

CHARLES J. SCHAUERS, W4VZC
c/o CQ, 300 WEST 43rd ST.,
NEW YORK 36, N. Y.

WHEN a receiver suddenly goes out after operating faithfully day in and day out over the months (or years), you can safely bet that a tube is causing the trouble . . . for more electronic equipment failures are due to bad tubes than for any other reason. So before tearing into any radio receiver to troubleshoot it, check the tubes.

Hint #1: be sure to mark each tube and its location before removing it for test . . . this being especially important with i.f. and oscillator tubes. The reason will be obvious if you will remember that the set was aligned originally with these tubes in place. Tubes of the same type are *not* all uniformly graded for specific internal capacitance . . . and a few micro-microfarads change in capacitance will affect receiver operation, especially at the higher frequencies.

While you are about the task of checking and replacing tubes, dust out the chassis using a hose type vacuum cleaner. Dust in the main tuning gang can be a cause for noise, so be certain to remove it carefully without disturbing plate spacing.

Hint #2: look for rust spots around a.f. and power transformers. If you find any, you may have a humidity problem which affects overall receiver operating efficiency.

The best way to cut down the effects of humidity is to allow your receiver to operate constantly or install a low power heater available for the purpose. Humidity can eventually ruin a receiver.

Hint #3: if your receiver is completely dead, first check the main line fuse . . . if it is gone, check for a power supply (high voltage or filament line short). If a rectifier tube checked out as *shorted,* replace the fuse and give it a short try. If it works, fine; but if it does not and the power transformer hums louder than usual, suspect a shorted filter condenser. If bypass capacitors in the screen circuits are shorted, an ohmmeter check (between screen and ground) at each tube will show up the culprit. Generally, a shorted filter (supply) condenser will cause fireworks in the rectifier tube.

Hint #4: make a quick voltage check at each plate and screen pin with a multi-meter set on the 500 volt scale. When you hit a stage that has little or no plate or screen voltage, look at your receiver schematic, then locate and check all resistors in the plate, screen and cathode circuits. If they are okay, then check all by-pass capacitors (especially in screen circuits) for high resistance shorts.

Hint #5: if you found a bad resistor, by-pass capacitor or open r.f. choke and replacing one or more of these does not restore operation, then you can begin to suspect an open coupling capacitor or i.f. transformer between stages.

Hint #6: if you have, or can borrow an r.f. and a.f. signal generator, you can start with the final a.f. stage grid and check each stage back to the first r.f. section by injecting (first) an a.f. signal to the detector, a.f. driver stage(s) and final a.f. stage. Then from the last i.f. back to the r.f. stage you can inject an r.f. signal (at the frequency of the operating stage). The r.f. signal should of course be modulated. When you find a stage that does not feed the signal through to the following stage (or no signal comes out of the set's speaker), this is the stage that you now intensively troubleshoot.

First, check the voltages on the stage. Next check coupling capacitors, i.f. transformers, antenna and r.f. coils (depending on the stage).

Hint #7: no or little r.f. feedthrough via the antenna connection should make you suspect the antenna coil or a shorted antenna trimmer. If these are okay, then proceed to the oscillator stage. Do check bandswitch contacts for cleanliness and proper contact. In less expensive receivers, always suspect bandswitch operation when your receiver drops off in performance, or all you can hear is background noise. With only background noise coming through the speaker (no signals), check the local oscillator stage.

Should you check a transistor circuit with an ohmmeter, be sure that your polarity of test prods is correct, otherwise you may kill a transistor.

To shoot trouble in transistor sets quickly, signal injection at each stage (as described above) should be employed.

Always look for the most simple causes of trouble *first.*

I hope that the information given on receiver troubleshooting will answer some of the many questions on the subject sent into HAM CLINIC by our younger and less experienced ham colleagues.

Questions

32S-1 and 75A4 Sidetone—"I have a 32S-1 and a 75A-4 receiver. How do I tie the side-tone from

the 32S into the receiver?"

Well, "Cap" (W4TAI) tells me that it can be done simply by coupling the sidetone output of the 32S-1 through a .001 mf capacitor to the top of the volume control (connection farthest from ground). If not enough sidetone comes through with the .001 mf condenser, a .01 mf capacitor can be used with success. Thanks "Cap" for the info.

DX-60 Fuse Blowing—"What causes the fuses to blow in my DX-60?"

A defective function switch . . . a shorted switch. The short will be found on the front side of the switch nearest to the chassis. When this switch shorts out it can blow the diodes. These diodes can be measured right in the circuit without removal by using an ohmmeter and measuring the front-to-back ratio which should be around 10:1.

DX-60 Audio Hum—"I have a little audio hum in my DX-60. Any hints?"

Yes. Place the condenser, C_{39}, .001 mf, which is in the input circuit of the first audio stage, (a 12AX7) as far away from the cable harness as practical and as close to the chassis as possible. Adding a shield between the cable harness and the input circuit is also a practical idea.

DX-60 Distortion—"I have been told on the air that my DX-60 exhibits some distortion on peaks. I hear other DX-60s and they sound real FB. What could I have done wrong in putting this set together?"

Perhaps nothing. Remember that not *every* similar electronic circuit will always operate exactly the same. Little changes in part values, part placement *etc.*, influence operating parameters.

Add an additional solder lug beneath the retaining nut of the bolt holding the 12AX7 tube socket in place closest to pin 9 and add an additional solder connection from pins 8 and 9 to the ground lug. This will clear up your difficulty.

DX-60 Loading on 40 Meters Only—"What is the reason for a DX-60 only loading on 40 meters? I must have goofed somewhere."

You sure did. You installed the rotor of the back section of the bandswitch 180 degrees out of phase with the wafer! Don't feel badly, we all make mistakes of this sort one time or other.

DX-60 Drive-Tune Control Peaking on 80 Meters—"How come the drive-tune control on my DX-60 will not peak across the entire 80 meter band?"

This is normal. Heath designed the kit in this manner so that the Delta C of the capacitor was arranged to prevent a double peak on the higher frequencies. If the capacity could be varied far enough on 80 meters it would be possible, say on 10 meters, to tune to the wrong harmonic.

Transistorized A.F. Oscillators—I breadboarded the oscillator shown in fig. 1 submitted

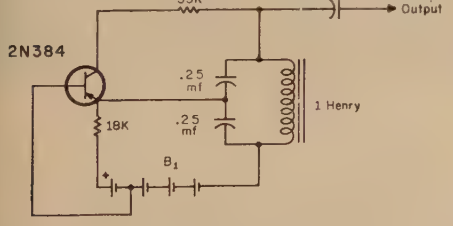


Fig. 1—A simple 1 kc oscillator circuit with good sine wave output. R_1 may be varied for best performance.

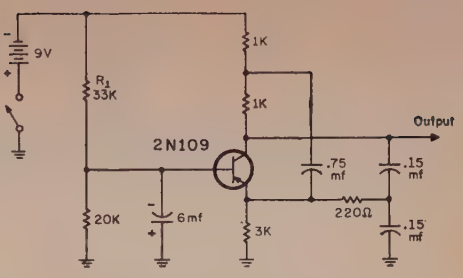


Fig. 2—Another 1 kc oscillator with good output and waveform. Battery B_1 consists of four 1½ volt penlite cells in series with a tap at 1½ volts.

by Alex Goldberger using the parts I had available. The output from this oscillator is a good sine wave at 1000 cycles, ideal for s.s.b. testing.

The oscillator in the March 1962 issue on page 83 will also work if you make the resistor connected to the base of the transistor 2.7K ohms and not 27K ohms. An SB-100 transistor will work when the CK-721 will not.

In fig. 2 is yet another 1000 cycle oscillator.

32V Series TVI—Joe Zelle, W8FAZ, passes along the following information: "Owners of the Collins 32V series transmitters will be interested to know of one strong source of TVI. It is the r.f. choke, L_{403}. It is located behind and above the 4D32 final amplifier tube. Because it is parallel to the final r.f. amplifier coil, L_{401} there must be some mutual coupling. W8CTI, Chief Engineer for Bud Radio of Cleveland suggests that the old fashioned r.f. choke be removed and a heavy duty r.f. choke such as Bud's CH-568 or National's R-175A, be utilized.

"Mounting the choke is no problem. It can occupy the position of the old L_{403} with one or two additional mounting holes or it can be mounted via the screws of the final plate current meter, M_{302}. The changeover was time well spent."

Plug-In Silicon Units—"I'm interested in replacing some of my small rectifier tubes in my equipment with silicon plug-in units. Would you give me some sources from which I can obtain information on these? What do they look like?"

Columbus Electronics Corporation's line of plug-in silicons should do the job. Replacements are available for usual tubes used in ham equipment (5U4, 5R4, 866, *etc.*). Prices range from $12.25 to $65.00. The company's address: 1000 Saw Mill River Road, Yonkers, N. Y.

Other sources for silicon units: International Rectifier Corporation, El Segundo, California and Sarkes Tarzian Inc., Bloomington, Indiana.

Incidentally, you can obtain replacement silicon units from TAB, 111 Liberty St. New York 6, N. Y. Their T5R4 units are priced at $7.00 and their T866 at $16.00; they have many others.

National Manuals—Owners of National Radio sets and equipment may be interested in this information: I recently had a nice letter from K1GXO, Harvey Whitmore, who is Service Manager for National Radio Company. Mr. Whitmore informs me that instruction manuals for many of the National receivers manufactured in past years are still available. There is a standard fee of $1.00 for these manuals which covers cost of handling and mailing. National has a special department

[*Continued on page 98*]

sideband sideband sideband

SIDEBAND

IRV and DOROTHY STRAUBER
K2HEA/K2MGE
12 ELM STREET, LYNBROOK, NEW YORK

SSB DX HONOR ROLL

TI2HP	272	W6RKP	230
VQ4ERR	271	W6BAF	229
W8PQQ	269	W5IYU	229
W8EAP	266	W6WNE	228
W2ZX	264	DL1IN	227
PY4TK	259	K1IXG	226
W2FXN	255	WØUUV	226
W6UOU	254	WØCVU	225
HB9TL	250	W2VCZ	225
W3NKM	250	G8KS	221
WØQVZ	250	G3NUG	221
MP4BBW	250	K6ZXW	215
K9EAB	250	W2YBO	214
W4OPM	250	W1WDD	213
K4TJL	248	G2BVN	212
K8RTW	244	YV5AFF	208
W5AFX	239	K6LGF	208
W6PXH	236	PJ2AA	204
K2MGE	235	K5MDX	201
W3LMA	234	K6MLS	201
W1OOS	234	UA3CR	201
W2JXH	233	G3FKM	201
W3MAC	233	W1AOL	200
PZ1AX	230	I1AMU	200
G3AWZ	230	KØCTL	200

CQ SSB STICKERS AND CERTIFICATES

Worked 250
W3NKM K9EAB
WØQVZ W4OPM
MP4BBW W6UOU

Worked 225
K1IXG W5IYU
W3MAC W6WNE
G3AWZ WØCVU
DL1IN W1OOS
WØUUV W2VCZ

Worked 200
G3FKM G3NUG
PJ2AA K4PUS
W1ORV W1WDD
K6LGF

Worked 175
G3FKM W1UOP
W4UWC WA2IZS
K2TDI

Worked 150
G3FKM W3FWD
W4NJF W3COG
WØQLX

Worked 125
KØTJW W8WT
G3FKM W3COG
W3FWD WØQLX

Worked 100
VK4FJ W3BVL
UR2AO W8QNW
LA5HE WØQLX
K8JGM

Worked 75
K5FLD G8TY
K4HYL W4PAA
W8QNW

Worked 50
TI2EH WA2MEC
W4PAA K2HOE
K5OPT

Worked 50—7 mc. only
K2GXI

SIDEBAND again played an important part in two major events this year . . . the stations operating at the Seattle World's Fair and at the International Trade Fair in Chicago.

K7USA was a magnet for many visitors to the Seattle World's Fair and put out a fine signal in the States and to other parts of the World. However, the location of the station was such that some difficulty was experienced in receiving and so our questions regarding activities didn't get through too well.

Thanks to Eve, K9EMS, we are able to pass on more details about W9TEM, the station operated so enthusiastically from McCormick Place from July 25 through August 12. "Fifty Years of Amateur Radio" was the theme of this year's ham activities and a display of antique gear and operation of a 1912 vintage station took visitors back through the years of ham radio. Two up-to-date Hallicrafters-equipped stations made well over 3000 contacts and handled many messages from Fair visitors and exhibitors. Among the most active operators were Mel, K9HVE; Kap, W9QKE; John, K9LOK; Eve, K9EMS; Lou, K9WLB; Lynn, K9IWR; Mary, K9BWJ; Dianne, K9-TRP; and Don, W9KUS; among others. The YLs are all members of Lark and the OMs belong to various other clubs, all of which are affiliated with the Chicago Area Radio Club Council, Inc. whose call, W9TEM, was used.

A distinctive full color QSL was promptly mailed at the conclusion of operations on August 12 to every station contacted. We join hams everywhere in congratulating the organizers of this efficiently planned event. Certainly it gave amateur radio a great boost in the Chicago area.

Third Method

We are all familiar, to a greater or lesser degree, with the twin conventional methods of single sideband generation; filter and phasing. There is yet a third method described by

Hearty congratulations to Leo Labutin, UA3CR, who is the first operator in all of the USSR to earn the "Worked 200" certificate on 2-way sideband. Leo is Sideband Editor of the Russian radio journal and has been responsible for getting many of the Soviet republics represented on sideband. Leo mentioned that he looks "angry" in the above photo only because an electric shaver was QRMing his Franz Josef Land DXpedition!!

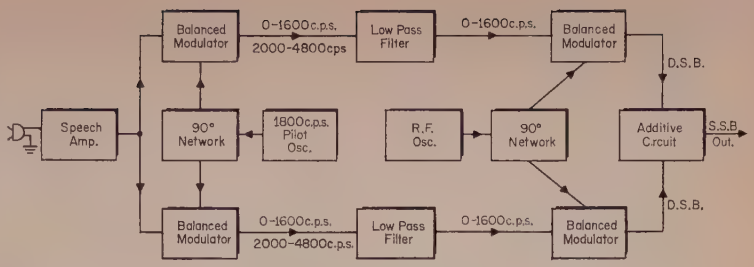


Fig. 1—Block diagram illustrating the "Third Method" of generating a single sideband signal.

D. K. Weaver in the *Proceedings of the I.R.E.* for December 1956 and outlined in the Single Sideband chapter of the *R.S.G.B. Handbook.* We think it is of interest; perhaps we may even see it being used by some of our more technically adept brethern or some adventurous manufacturer.

The system has two claimed advantages; better fidelity than a filter system and better sideband suppression than a strictly phasing rig. The filter rigs require a high degree of stability to locate the carrier in exactly the right frequency relationship to the pass band. Should the carrier drift into the passband or in the opposite direction, the received signal will be degraded. Even when perfectly adjusted, the filter system causes a loss of

Victor Lemoine, HH2V, Port-Au-Prince, has long been one of Haiti's outstanding amateurs. His enthusiasm for sideband even extends to using it on 160.

naturalness arising from a changing response curve of most filters under dynamic conditions.

The phasing system has better audio quality but suffers from the inherent inability of the system to provide 90 degree phase shift over the required audio spectrum limiting the degree of sideband suppression.

The third method combines the principles of both systems in such a fashion that a wideband phase shift network is unnecessary and the cut off characteristics of the filters are not severe enough to detract from the audio quality. The method is shown below in block diagram.

The output of the pilot oscillator, P_1, is applied to a differential phase shift network of a low Q. The two components appearing in the output are adjusted to be equal in amplitude and exactly 90 degrees out of phase. The suggested frequency of the pilot oscillator is in the 1600-1800 cps. range; higher frequencies in the order of 4 to 5 kc can be used but they would require more highly sophisticated low pass filter design. The output of the phase shift network and that of the speech amplier are applied to two separate balanced modulators. The output of these identical modulators consists of two double-sideband signals 90 degrees out of phase; the pilot carrier being suppressed. The high frefrequency sidebands are eliminated from both channels by a pair of identical low pass audio filters. The band pass of these filters, assuming a pilot frequency of 1800 c.p.s. and a minimum modulating frequency of 200 c.p.s., then runs up to 1600 c.p.s., attenuating rapidly from this point and reaching a maximum rejection at 2000 c.p.s. Standard tolerance components can be used as high stability is not required.

The audio signals from the filters are applied to a second pair of balanced modulators together with the output of a second r.f. phase shift network exactly the same as in a conventional phasing generator. The r.f. oscillator may be at the fundamental frequency or if multiband operation is desired, at a frequency convenient for heterodyning to the required bands. The output of the second set of modulators are double sideband signals which are combined in an additive tank circuit where the wanted sidebands, those in phase, reinforce each other and the unwanted sidebands, those out of phase with each other, cancel themselves out. The extent of the cancellation depends upon the accuracy of the two 90 degree networks. It is claimed that 40 db of attenuation is possible.

[*Continued on page 96*]

It's not often that you get the rare pleasure of seeing so many Australian sidebanders grouped together but today is your lucky day. Shown above are l. to r. Phil, VK5NN; Tom, VK5AQ; Clive, VK5PE; Shep, VK5DC; Comps, VK5EF; and Al, VK5MF. *(Photo courtesy of VK5NN)*

RTTY

BYRON H. KRETZMAN, W2JTP
431 WOODBURY ROAD,
HUNTINGTON, NEW YORK

SINCE the recent publication of the *New RTTY Handbook* by the Cowan Publishing Corporation we have had many letters from fellows who are building the Transistorized Tuning Fork Standard, described beginning on page 174. This extremely useful piece of test equipment for the radioteletype station utilizes a magnet bias circuit for the tuning fork. Most of the questions received are about this magnetic circuit, so for this month's tidbit of teleprinter technology we have an explanatory detailed drawing and a few additional words of wisdom (?).

The Magnetic Circuit

Figure 1 is a drawing, actually a "section" made through the middle, of the Tuning Fork Standard looking into the end of the unit, the end containing the magnetic circuit. The source of the magnetic "current" is the small cylindrical alnico magnet. The exciting coils are still mounted on their original soft iron pole pieces. The right-angle bend in each pole piece extension was retained without modification. It may be necessary, with the particular coil assemblies obtained, to extend the magnetic circuit with an additional piece of steel strap to get good magnetic contact with the steel bolts and nuts that go to the alnico magnet.

The business of soldering to the alnico magnet has caused many a physics student to throw up his hands in horror. ("The heat will kill the magnet!") Wal, t'aint so. That is, if you use common sense. First of all, thoroughly clean and polish with emery cloth the ends of both the alnico magnet and the top of each hex-head bolt. Now, don't use a propane torch. Use a 200 watt soldering iron; the job can even be done with a 100 watt iron. Hold the alnico magnet in a vise and tin the ends, using no more heat than necessary. Wipe off as much excess solder as possible. Second, tin the top of the head of each of the hex-head bolts. Don't be afraid of using too much heat here. Again, wipe off the excess solder.

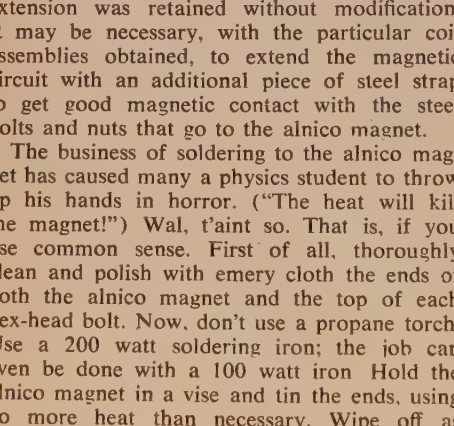


Fig. 1—End view of the transistorized tuning fork standard.

To mate the alnico magnet and a hex-head bolt, get the bolt head hot enough to flow solder, heat the surface of the alnico magnet just a little bit, then quickly press the head of the hot bolt on to the magnet. The joint will immediately cool enough to quickly stick the bolt, so place it as accurately as possible. If you haven't used too much solder you will then have a good magnetic joint. By the way, the bolts and nuts needn't be bare steel (it rusts); they can be cadmium plated. Be sure, too, that the nuts are also steel.

The right-angle support brackets should be aluminum or brass as should the support spacers. We did mention in the book, that the mounting plate should be aluminum. You can readily see, from the end view, that if the support hardware and the plate were made of magnetic material there would be a magnetic "short circuit."

The Electrical Circuit

Many RTTYers have asked how to determine the correct polarity of the exciting coils. The schematic diagram, fig. 7.4a1 on page 174 of the *New RTTY Handbook* is correct if you assume that the bottom of each coil, L_1 and L_2, as shown is the beginning of a winding and that the top of each coil is the end of the winding. If you can't see which lead wire is the beginning of the coils you have, don't worry—it's a 50-50 chance you pick the right ends. If the fork doesn't oscillate, simply reverse the polarity of *one* of the coils. Remember, too, that this oscillator is slow starting because of the mass of the fork itself. Give it at least 5 seconds to get going.

Figure 2 is the layout of the parts on the printed circuit board. This is the *top* of the board. The effective circuit of the printed circuit wiring underneath is shown as dotted lines. Note that three capacitors are connected in parallel for each shown schematically as C_8, C_9, C_{10}, and C_{11}. The toroids L_3 and L_4; and L_5 and L_6, are mounted one above the other. It doesn't make any difference which one is on top. They should be separated, however, by at least ⅛ inch.

If you use the inexpensive 2N107 transistors it may be necessary to switch them around to get a good oscillator. We didn't use transistor sockets, but we can see where they might be handy at first. In addition, we have since found that the *RCA* type 2N109 transistors, also relatively inexpensive, are more uniform in characteristics.

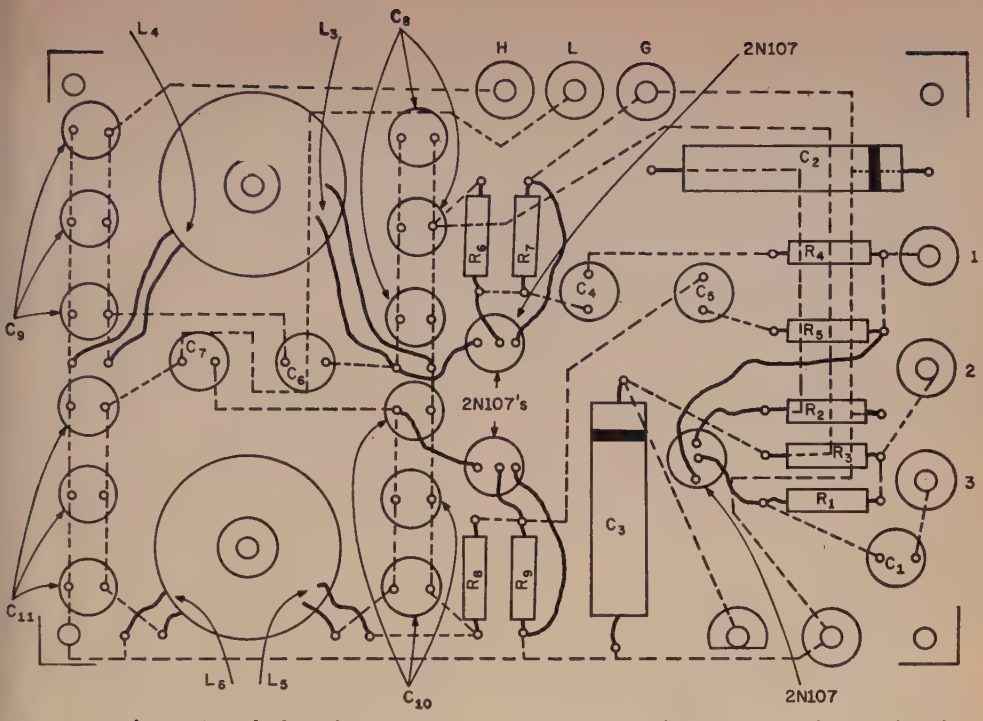


Fig. 2—Parts layout on printed circuit board.

The Printed Circuit

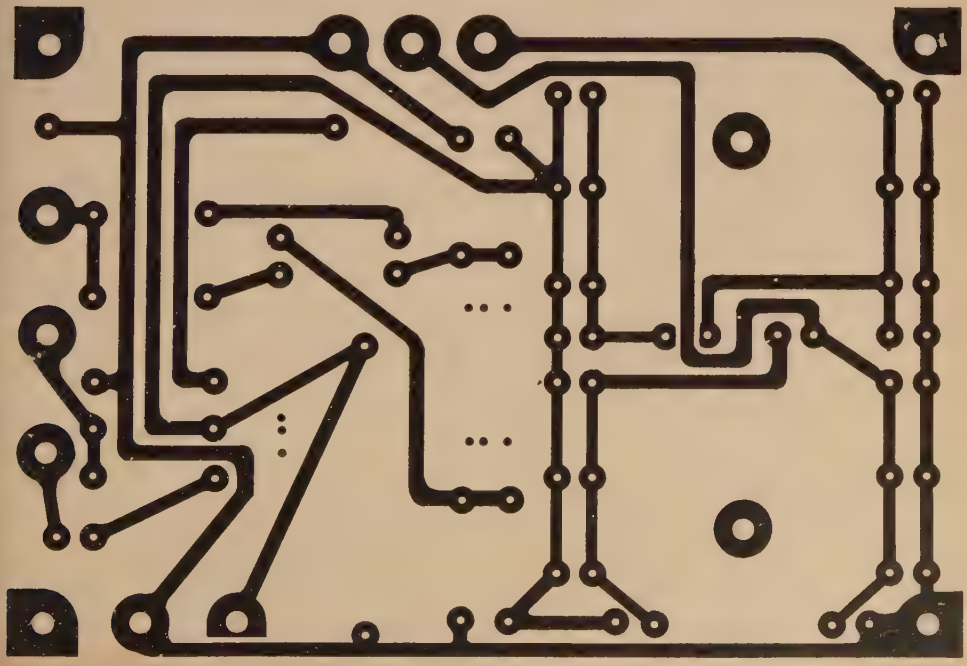
Figure 3 is the actual printed circuit used. (This was hand-made.) We have had requests, like where can these boards be obtained. Well, our first answer is to tell you to make it yourself, like we did. So far we have been unsuccessful, like "Project Dispair," in getting these made up at a *reasonable* price, even for a quantity of 200. We just don't believe that a price of more than a dollar each is reasonable for an amateur to pay.

Fig. 3—Printed circuit board wiring.

Comments

Strangely, or so it seems to us, many fellows write to us asking how they might FSK a KWM, or a Viking, or perhaps an HT-32. Now, we appreciate the compliment, but most of the companies that build equipment for the amateur market maintain a "customer service" department whose sole purpose is to answer questions like these. Naturally, they keep a

[*Continued on page 102*]



BY WALTER G. BURDINE, W8ZCV
R.F.D. 3, WAYNESVILLE, OHIO

Novice

THE world is full of would be amateurs, most of whom fear taking the test. Almost anyone working in the radio industry has either the theory or the code well learned but, because they think it to hard to learn the other necessary element, don't take the examination. Many people, at both extremes of the age bracket, prove that the required knowledge can be acquired by a little consistent study.

When you appear for examination, try to be cool, calm and collected. Don't forget, you are not the first person to take the test; take it easy. Read carefully and take the necessary time for each answer; be sure you answer in the right block. Keep your mind on the task at hand; nothing else matters but passing that test and getting your license. Be on time, be prepared with your forms correctly filled out, get comfortable, make up your mind that you are going to pass *this* time and you are well on your way to a license.

Silent Key . . . Ed Bonnet

While this column may not be read for the purpose following, I feel that the passing of Ed Bonnet, W8OVG has more than a passing interest to many, many hams in Ohio and surrounding states. Every year, at the Dayton Hamvention, Ed has helped the Radio Inspector with the examinations that are given. Literally hundreds of hams in this area have had contact with Ed, either at the examination tables or by attending one of the classes that Ed has been associated with locally. He has given hundreds of Novice and Technician tests and was never too busy to help the aspiring amateur. He sure deserves all the praise that local hams give him; he was a HAM's Ham. He died June 15, from complications following hospitalization.

Learning the Code

Mastering the code is mainly a matter o practice, practice and more practice. Acquirin the art of transmitting and receiving the tele graphic code consists of: Natural Ability—5% Psychology—10%, Study and Practice—85% Please note that study and practice portion Keep in mind that it is best not to practice cod more than 20 to 30 minutes at a time. Mor than 30 minutes seems to hinder more than helps.

If you have a friend to help you during you practice it will be more enjoyable. Try not t talk to one another except by using code, tha will help you gain speed. Use your receiver t listen to code. It will be interesting and yo will also become acquainted with operating pr cedure. When you hear a Q signal, look it u Q signals are used in telegraphic communicatio to speed up the transmission of intelligence. signals are what you might call radio shor hand, a three letter Q signal replaces severa longer words.

The code can be learned in a short time, de pending upon the amount of time expended an the regularity of the practice periods. Wit regular practice periods you should be able t copy 15 w.p.m. in 75 to 100 hours. When seems as though you are at a standstill, it likely that you are ready to make a big jum in speed. You will find plateaus at which seems impossible to copy code at a faster speed When you reach a plateau keep right on copy ing. I would suggest that you keep right o ing.

To begin you will need a telegraph key an a code oscillator. The telegraph key can b

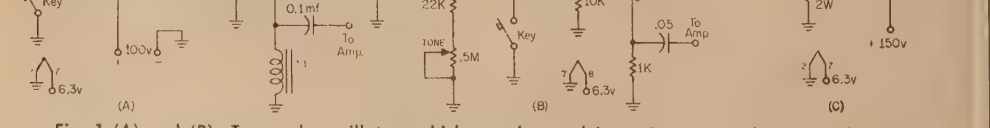


Fig. 1 (A) and (B)—Two code oscillators which may be used in conjunction with the amplifier of (C) to provide ample audio output for code practice by large groups of amateurs. (A) is a phase-shift type while (B) is a simple multivibrator, which includes a tone control. Inductance L_1 may be between 10 and 50 hy while Transformer T_1 is a standard 50L6 output transformer.

bought for from two to five dollars from a local radio supply house or from a mail-order supply store.

The code oscillator is an electronic device that generates an oscillation within the audio range (20-20,000 c.p.s.) Breaking the oscillating tone into pulses of long and short duration is the method of forming code characters, a short duration pulse is a dot (dit) and a pulse that is three times the duration of the dot is called a dash (dah). The space between parts of a letter is equal to one dit, between each letter the spacing is equal to three dits and between eah word the spacing is aqual to five dits. Correct spacing is the sign of a good operator. Incorrect spacing can make a letter sound like two other letters.

The International Morse Code is used by most nations when code is sent by hand or automatic senders. Learn the code by sound, not by the dots and dashes as written. The dot is spoken as dit and the dash is dah, thus N would be dah-dit. By learning the code by sound you will be able to copy from your receiver.

There are a number of stations that send code practice and this is a good way to improve your copying ability. These stations always send well spaced characters. W1AW sends code at speeds of 5 to 35 w.p.m. This code is always well sent and at exactly the speed specified. If you can copy their code at the next higher speed you are ready to take the examination.

If you can get a friend to help you, well and good, if not, use your phonograph or one of the automatic tape senders sold on the market. The phono method is a good way to find out how good code sounds. Automatic keyers can be used to augment the practice periods with your friends.

Code records can be bought from your local radio or record store. The record method of learning the code starts at a slow speed and gradually increases as you progress.

The key and the correct positioning of the key are two very important items when learning to send correctly. Use a straight key at least until you get your license.

The key should be placed about 18 inches from the front of the operating table (less for the younger op) so that the elbow rests on the table. The forearm should rest naturally upon the table. Hold the knob of the key lightly, with the thumb along the edge and the index and third finger resting on the front edge of the key knob. The fourth finger will just naturally fall on the opposite side of the key from the thumb. Let your hand rest on the key gently. Hold the knob gently, relax and take it easy. Don't try to hurry. Adjust the key so that the contact points are about 1/16th inch apart and adjust the spring tension until the key operates smoothly.

Letters

I received this letter from Ed Howison, WN8AXB, Columbus, Ohio and then came face to face with him next day at the Lancaster Hamfest, at Lancaster, Ohio. I enjoyed meeting Ed and boy, did I ever enjoy meeting old Smitty, K8BAW. I'll tell you about him some day, after I move to Alaska. Anyway Ed passes along this information.

"Dear Walt· I am getting good code practice in an easy way which I thought you might like to pass along to the gang.

"Fortunately my second hand receiver picks up W1AW with ease. I started with 5, 7½, 10, and 13 w.p.m. and on alternate evenings was letting the 15 w.p.m. and faster speeds go to waste. Then I borrowed a tape recorder, (any old two-speed recorder will do), turned the b.f.o. up to a higher pitch and recorded the fast transmissions at 7½ i.p.s. By playing them back at 3¾ i.p.s., I had double the transmission time at 7½, 10, 12½, 15 and 17½ w.p.m. As a bonus the background noise is less.

"Afterthought: this might be an easy way for the General to give Novice and Technician exams, *i.e.* by taping W1AW at 5 w.p.m. ahead of time, unbeknownst to the candidate.

" I hope I sign my next letter "WA" Sincerely, Ed."

Thanks Ed. I'm glad I had the chance to meet you and I wish you the best of luck on the General ticket. This is a very good idea, you will note that we have other good ideas sprinkled throughout this column, and they all came from you, our readers. I told you that our column would grow if you helped; well just look!

Just to prove to you that Nevada has amateurs there, here's a short note from Tony Morgan, KN7TRG, Las Vegas.

"Dear Walt: I am a faithful reader of your NOVICE COLUMN in *CQ* and I never miss it. I am 12 years old and practically live in my shack.

"The rig is a Johnson Adventurer running 50 watts to a Hy-Gain 14AVS vertical. The receiver is a Mosley CM-1.

"My WAS is 17/8 including Hawaii. I will sked anyone on 15 and 40 meters, I need zones 1, 3 and Ø most. So thanks Walt and 73, Tony."

Bob Van Winkle, Olivehurst, California queries: "Dear Walt: I have a fairly simple question to ask, and I am sure many others would be interested also.

[*Continued on page 98*]

Space Communications

GEORGE JACOBS, W3ASK
11307 CLARA STREET,
SILVER SPRING, MARYLAND

THE Project OSCAR Association has completed its official report on OSCAR I—amateur radio's first venture into space. The report reviews the background of the project, the project's objectives, and its accomplishments. Much of the data contained in the report has appeared previously in this column. The following is a summary of the major accomplishments of OSCAR I, as discussed in the report.

Amateurs In Space Age

OSCAR I was successful in introducing amateur radio to space communications. More than 5200 individual tracking and reception reports of OSCAR I's 2 meter beacon transmitter were received by the OSCAR Data Reduction Center (Box 183, Sunnyvale, California). These reports were submitted by 570 radio amateurs and other observers representing 25 different countries in all corners of the world. These reports ranged from simple "I heard it!!!" to complex and technically sophisticated observation of Doppler shift, HI rate, and orbital parameters. The 570 pioneers who reported their observations to the OSCAR Data Reduction Center, and the countless number of other observers who heard OSCAR I's signal but neglected to submit a report, form an experienced and very valuable nucleus for future experiments planned in the OSCAR program—experiments which are intended to eventually develop long distant two-way v.h.f. communication between radio amateurs using a satellite as a relay.

OSCAR I also stimulated the development of advanced state of the art of receiving, antenna and tracking equipment, and measurement techniques, proving once again that amateur radio can contribute significantly to the development of new methods of communication and the advancement of science.

Satellite Tracking

OSCAR I's 100-milliwatt beacon transmitter, operating on approximately 144.983 mc, was heard at distances up to approximately 1400 miles from the point on earth where the satellite was directly overhead. This agrees well with the theoretically determined radio horizon for OSCAR I's orbit. The signal could be heard clearly for as long as eight minutes on overhead passes, while passes more distant from the observer were heard for shorter periods.

Based upon the reports submitted to the OSCAR Data Reduction Center, it was possible for the Center to release orbital information and expected flyover times for major cities of the world on a regular basis. Many observers devised their own methods for predicting passes of the OSCAR I satellite with a high degree of accuracy.

The worldwide observation of the OSCAR I beacon transmitter proved that radio amateurs are capable of tracking a space satellite, of gaining scientific information from their observations, and of putting this information to use for predicting orbital parameters.

Propagation

Another significant accomplishment of the OSCAR I experiment was in the field of v.h.f. radio propagation. Most of the reports received by the Data Reduction Center indicated that OSCAR I's signal appeared and disappeared abruptly, indicating that the radio range was horizon-limited as one would expect. However, there were several reports of the satellite's signal being received initially for several seconds, followed by a quick fadeout, then reappearance of the signal again. Similar reception was also sometimes observed as the satellite disappeared over the horizon at the end of a pass. This unusual reception is apparently due to diffraction of the signal shortly before the satellite came over, or shortly after it passed behind the horizon. This phenomenon will be studied further as the results of OSCAR II are evaluated.

Several independent reports from Alaska and South Africa confirm that OSCAR's signal could not be heard when aurora was present. Apparently the satellite's v.h.f. signal was prevented from reaching the earth by the dense ionization associated with auroral displays. OSCAR I's signal also appeared to be effected by ionospheric disturbances in tropical regions where some observers reported fluctuations in signal strength and gradual, rolling fades.

Several other unexplainable reports were received which will require additional study. While the radio horizon to the satellite was approximately 1400 miles, W6CQI (California) reported hearing OSCAR I's beacon transmitter when the satellite was over the South Atlantic Ocean, near the Falkland Islands, more than 7000 miles away. WØWVM (Minnesota) reported reception of a pass well out over the Pacific Ocean, at a distance several times beyond the radio horizon. Reception in both these cases may have been due to the effects of the earth's magnetic field, and requires further study.

Here's a shot of the 36-foot-diameter Kennedy "dish" antenna used by KH6UK in his record-breaking moonbounce QSO with W1BU. After several weeks of fragmentary copy, "Tommy" Thomas near Honolulu, Hawaii and Sam Harris near Medfield, Mass., finally exchanged solid two-way c.w. messages on 1296 mc at 0148 GMT, August 9. Tommy and Sam both used Eimac one-kw klystrons. Both are to be congratulated for establishing a new 1296 mc DX record and a new radio amateur distance record for moonbounce communication. The distance between KH6UK and W1BU is almost exactly 5000 miles. *(Photo courtesy W6SAI).*

Satellite Temperature

OSCAR I reception reports were successful in determining, on an almost continuous basis, the temperature within the satellite. This is a very important parameter since it indicates the probable life of the satellite. The internal temperature of OSCAR I was measured by the amount of time it took the satellite's beacon transmitter to send a series of "HIs" in Morse Code. The keyer in the OSCAR I circuit design was so timed that 10 HIs sent in 40 seconds represented a temperature of 50 degrees F, while at the other end of a linear scale. 10 HIs sent in 5 seconds represented a temperature of 140 degrees F.

The reports received by the Data Reduction Center show that during most of its life, the average internal temperature of the OSCAR I package was about 127 degrees F. An unusual dip in temperature, to slightly less than 100 degrees F, took place during revolution #40-43. More than 30 independent reports confirm this temperature quirk, so there can be little doubt of its authenticity. One explanation for its cause may be the evaporation of condensation which may have been trapped within the satellite. This could produce a secondary cooling effect which would last until the moisture was gone. This unusual drop in temperature is still under study.

OSCARs II and III

Next month's column will discuss some initial results of the OSCAR II experiment. The second in the series of radio amateur satellites was in orbit from June 2-20, 1962.

The latest news from the Project OSCAR Association concerning OSCAR III is that considerable headway is being made with the design of a satellite which will be able to receive and simultaneously relay radio amateur signals in portions of the 2 meter band. What appeared at first to be insurmountable design problems are now being overcome, and a bread-board design of what may ultimately become OSCAR III, is expected to be tested sometime this month.

Plans are also underway to make OSCAR III a truly international amateur radio project. Project OSCAR coordinators in more than two-dozen countries have been asked by the Project OSCAR Association to determine the extent to which their national radio organizations could participate in building various parts of the OSCAR III satellite. More on this next month.

NASA Plans Major Satellite Launchings

During the last three months of 1962, NASA plans no fewer than five additional major launchings. Among these is a second RELAY launching and two more TELSTARS, as well as the launching of the 135-foot-diameter ECHO II communication satellite. ECHO II, a rigidized balloon, will act as a giant passive reflector of radio signals in the u.h.f. microwave ranges. If all goes according to present plans, there may be as many as six active communication satellites in orbit by the end of the year (4 TELSTARS and 2 RELAYS), and two passive communication satellites (ECHOs I and II).

In addition to the communication satellites, NASA plans to launch another RANGER and another TIROS satellite sometime during the last three months of 1962. Both the satellites are loaded with communications equipment. The RANGER will be another attempt by NASA to crash-land an instrument package on the moon. Television cameras on board the satellite are expected to take pictures of the moon as RANGER approaches its surface, and flash them back to observers on earth. TIROS is a weather satelilte that relies on two independent television channels for sending cloud-area pictures and other meteorological data back to earth for analysis. The communication aspects of these satellites will be discussed in more detail in this column in the near future.

73, George, W3ASK

The USA-CA Program

BY CLIF EVANS*, K6BX

HAVE received scores of letters from recipients of USA-CA expressing flowery appreciation that so beautiful and significant an award has been made available. An appropriate summary might be, "WOW"—this is one I'm going to display in most prominent place in shack." See full page picture of USA-CA in July issue *CQ*.

Another important general reaction to USA-CA is a mass realization that it is not just an award as such but a mammouth program of unlimited fun. Also emerging into limelight is fact that USA-CA participation is worth a college education in U.S. geography, history, political science and some of the other humanities.

On the latter theme, Betty, K4ZNK, winner of #111, had this to say, ". . . just finished my 20th year teaching . . . my son will attend college where I teach this year . . . must say the USA-CA Program offers an unlimited approach to hobby fun while also generating a wealth of information . . . it is truly a media of painless education highly beneficial to all ages."

An interesting parallel of thinking: after we published data on the Villinova college award in July issue, several college club's have written asking if club stations might work for USA-CA. The answer, of course, is yes! Also s.w.l.s may work for USA-CA on a heard basis . . . we wouldn't keep USA-CA 'Unlimited Fun' from anyone.

Three USA-CA winners have been added. They are:

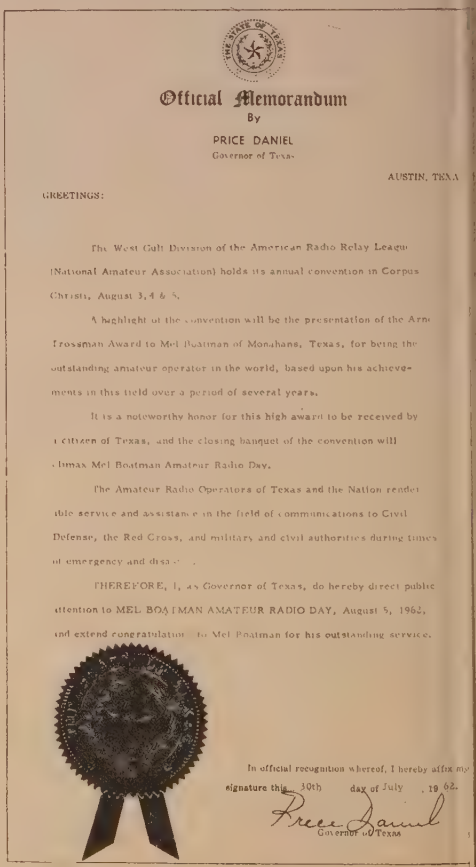
W8KPL	109
W3BVL	110
K4ZNK	111

Mel Boatman Day

Down Texas way on August 5th it was Mel Boatman (W5AWT) Amateur Radio Day from the Governor right down to the last lone cow hand. Having a few kin in the wilds of the Lone Star state, we always knew Texans did things up big, and Mel Boatman Day was no exception. Let's let the following picture story show what happened to a Texas ham when he was the first Texan to win the Arne Trossman Top Honors Plaque and CHC-200 Top Honors' Award.

*United States of America Counties Award Custodian. Box 385, Bonita, California.

Pictured above is Ben F. McDonald, Mayor of the City of Corpus Christi, Texas, signing Proclamation declaring Aug. 5, 1962 as "Mel Boatman Day". Standing beside the Mayor is Dr. R. O. Best, W5QK of Corpus Christi, Director of the West Gulf Division.



Official Memorandum

By

PRICE DANIEL

Governor of Texas

AUSTIN, TEXAS

GREETINGS:

The West Gulf Division of the American Radio Relay League (National Amateur Association) holds its annual convention in Corpus Christi, August 3, 4 & 5.

A highlight of the convention will be the presentation of the Arne Trossman Award to Mel Boatman of Monahans, Texas, for being the outstanding amateur operator in the world, based upon his achievements in this field over a period of several years.

It is a noteworthy honor for this high award to be received by a citizen of Texas, and the closing banquet of the convention will climax Mel Boatman Amateur Radio Day.

The Amateur Radio Operators of Texas and the Nation render valuable service and assistance in the field of communications to Civil Defense, the Red Cross, and military and civil authorities during times of emergency and disaster.

THEREFORE, I, as Governor of Texas, do hereby direct public attention to MEL BOATMAN AMATEUR RADIO DAY, August 5, 1962, and extend congratulations to Mel Boatman for his outstanding service.

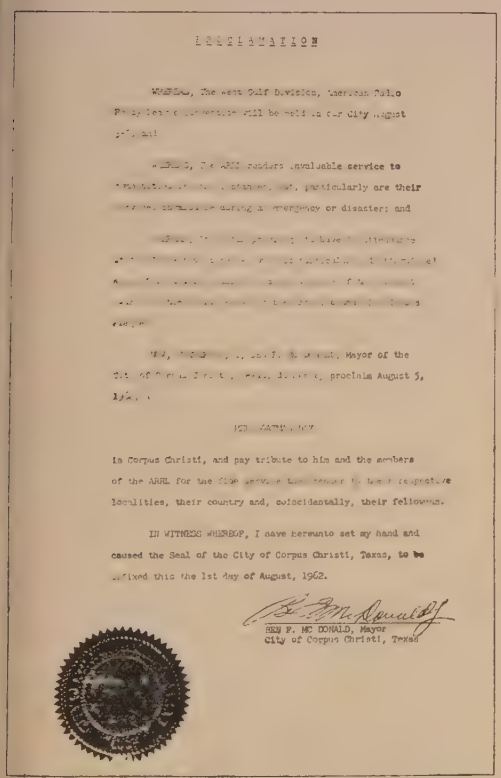
In official recognition whereof, I hereby affix my signature this 30th day of July, 1962.

Price Daniel

Governor of Texas

The Official Memorandum by Price Daniel, Governor of the State of Texas, proclaiming August 5, 1962 as "Mel Boatman (W5AWT) Amateur Radio Day". The reason for such action was the fact that Mel had just won hamdom's highest achievement honor and presentation was to be made at the annual convention of ARRL West Gulf Division meeting in Corpus Christi, Texas on August 3-5.

Here is Mel Boatman, W5AWT, 1962 President of the Certificate Hunters' Club, being presented the Arne Trossman Top Honors Plaque. Presentation was made by Bob Douglas, W5GEL, during banquet held by South West Gulf Division convention held in Corpus Christi, Texas, August 3-5. Seated at the table directly in front of Mel is "Soupy" Groves, W5NW, First Vice President of ARRL. Mel joined the Top Honors' Fraternity and CHC Top Honors' Chapter by virtue of winning over two hundred amateur radio achievement awards covering a diversity of fields. See April issue of CQ for details covering the Arne Trossman Top Honors award. Yes, there was no doubt about it in Texas, August 5th was Mel Boatman Amateur Radio Day.



PROCLAMATION

WHEREAS, The West Gulf Division, American Radio Relay League convention will be held in our City August [illegible]

WHEREAS, The ARRL renders invaluable service to [illegible] particularly are their services available during an emergency or disaster; and

[illegible]

NOW, THEREFORE, I, [illegible], Mayor of the City of Corpus Christi, Texas, proclaim August 5, 1962,

[illegible]

in Corpus Christi, and pay tribute to him and the members of the ARRL for the fine service they render to their respective localities, their country and, coincidentally, their fellowmen.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Seal of the City of Corpus Christi, Texas, to be affixed this the 1st day of August, 1962.

BEN F. MC DONALD, Mayor
City of Corpus Christi, Texas

Proclamation by Corpus Christi's Mayor McDonald declaring Aug. 5, 1962 as Mel Boatman Day in Corpus Christi, Texas.

We Get Letters

S.w.l. Dick Harris (Ark.): "Appreciate your articles spotlighting 'Sad Sack' plight of s.w.l.s. Many s.w.l.s commend your views. I am working for USA-CA and, since I started adding note of such on my QSLs, returns have more than doubled."

K5BNQ, Doris: "Enjoy your *CQ* column immensely. Fully agree with your attitude about s.w.l.s and CBers. I answer every s.w.l. card and always add a few words of appreciation and encouragement. We indeed should recognize them in appropriate capacity within our fraternity."

WA2VFU, Elliot: "I have learned so very much about the USA while having fun with USA-CA. It brings out many things one would not normally learn at school. I am just a beginner and teenager, but I wanted to let you know how we teenagers react to USA-CA and the things you are doing . . . and what we are talking about."

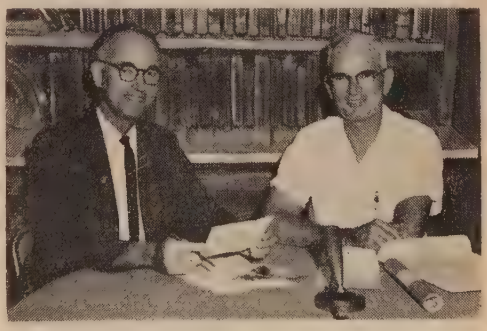
K8TBR, Bob: "Your section of *CQ* is a very fine addition to a good hobby magazine. *CQ* has been showing tremendous improvement the past year."

WA6ATY, Bob: "Sure enjoy the USA-CA column. Know of several cases of folks who occasionally picked up *CQ* at the stands, now are regular subscribers just because of USA-CA Program which, by the way, is more than an awards column . . . it is a high interest *news* column."

WN9AKP, Ed: "Let me commend your USA-CA column speaking for this Novice family of three: WN9AKP, the Old Man; WN9AKQ, our son harmonic and WN9AKR, the XYL. Please send us full information on WAZ, WPX, CHC and other interesting 'hunters' programs with which you are connected."

WN4CMV: "Wanted to tell you I really look forward to your USA-CA news each month. I'll be more than happy to help DXers identify counties so put me down for the USA-CA Good Will Club. Anyone needing Rockingham County, N.C., can sked me."

W5LGG, Len: "Thanks for your tremendous efforts to make ham radio much more enjoyable for all."



Pictured here is Lynn Pentony, KRIS-TV News Editor interviewing Mel Boatman, W5AWT, on live TV show. KRIS-TV gave full coverage of Mel's winning the Arne Trossman Top Honors Plaque which was presented to him. The Old Man would like to thank T. Frank Smith, W5VA/W5AI, of KRIS-TV Channel 6, Gulf Coast Broadcasting Company, and his staff, for the outstanding cooperation and coverage honoring Mel, W5AWT, 1962 President of CHC and holder of CHC-200 Top Honors. To them goes most of the credit for such outstanding TV and news publicity. (*All photos courtesy KRIS-TV and W5VA*).

K4CDY, Andy: "Your column is tops. Sign me up for the Good Will Club. Send me all the 'poop sheets' the 8¢ s.a.s.e. herewith will handle."
K8CIR, Oscar: "I am having a ball with USA-CA and HTHing. These two programs alone provide me unlimited fun."
WA2NFN, WA2ONO, K3DFU, K5BTM, K5WWL, K7IMP, WN8DOF, WØARA: "Keep up the good work. Put me down for the USA-CA Good Will Club."
K1PMJ, Henry: "Clif, let me join the thousands of 'hunters' who eagerly look forward to your column every month and the choice bits of high interest news you always come up with. Be assured all of us appreciate your bringing this valuable information to us."
W3KDP, Ren: "Clif, for 31 years now I had been putting all my QSLs in shoe boxes stored in the attic . . . then you came along with your highly interesting programs with a new approach to, as you say, 'Fun Unlimited'. Your programs have been a Godsend to me . . . especially during recent period of illness . . . thanks for giving another 'Old Goat' a new lease on many pleasures of life."

CHC YL Chapter Sponsors New Award

The CHC YL Chapter #4, announces sponsorship of a new awards program for working members. The beautiful 11×14" award will picture a "Queen of the Hunt" with flowing purple gown upon which can be placed up to seven gold seals for various classes.

Name of the award is Hunt the YL Hunters award (HYLH). The seven classes and requirements are: (NA is North America)

Class	*Total Contacts*	*Min. States*	*Min. Countries*
A-NA	300	50	10
A-DX	175	40	10
B NA	200	40	7
B-DX	150	35	6
C-NA	150	35	6
C-DX	125	30	5
D-NA	100	30	5
D-DX	75	25	4
E-NA	75	25	4
E-DX	60	20	3
F-NA	50	20	3
F-DX	40	15	2
G-NA	any 25		
G-DX	any 20		

The award will be endorsed for all one band or mode or mixed. All CHC and Directory rules apply. KH and KL count for both state and country represented. Own state and country counts. Contacts must have been made with members during or after the year they joined CHC. Associate members (non CHCers) count ½ point credit, but count fully for state or country.

Apply with GCR (certified) list with log data, alphabetical by call, with $1 handling fee to Custodian, Tillie Curington, KØRGU, 2067 Brentwood, Denver 15, Colorado. For seals, send s.a.s.e. or appropriate IRC.

Do not send QSLs. All communications must include s.a.s.e.

See Louisa's YL COLUMN this issue and August issue for story on the YLs of CHC Chapter #4. Last we heard they were up to fifty-five members, but then, just in the last few days, YLs WA6OET, W7GGV, K8MQB, KØWEN, K1ADY, W5RWR and K9TRP joined CHC so by now the list is well over sixty. At the rate YLs are now joining CHC we predict the Chapter will have 150 members world-wide within a year.

Boy, these gals move fast . . . the mail man just brought me post card from KØRGU, Tillie . . . she says Sue, K5SBN won HYLH Class G award number one on August 28, 1962 . . . so the 'hunt' is really on. We will bring you a picture of this beautiful award in a later issue.

We have read in another 'popular' ham journal, criticism of club awards sponsored for working own members; we'd like to set the record straight that the CHC YL Chapter #4 has as its stated goals, among others, the following four CHC Purposes:

1. Bringing to public attention, locally, nationally and internationally, the tremendous contributions amateurs make to the art and science of communications and to universal understanding and good will among the world's peoples.
2. Supporting and giving publicity to other organizations and publications seeking similar goals.
3. Promoting amateur operations on all bands and by all modes and with wider scope of participation.
4. Giving due recognition to those amateurs who excell in many fields rather than just one, and who contribute most to today's history of amateur radio.

One need but look at the Chapter's membership to recognize these are the YLs making today's hamdom history.

College Ham Stations

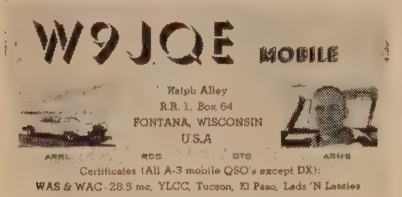
Seems like the Villanova University award covered in July *CQ* generated considerable interest. Eleven additional college stations wrote in asking to be added to the original 190 we previously listed, so we are up to 201. If you are interested in working for the work colleges award, add these to the list: W1ET, W2BXK, W2FXR, K2GQG, W3RPB W6BB, W7YG, K9VRU, W9YB, VE4UM and VE5STC. Let me know if there are others.

Correction on S.W.L. QTH

In July issue, page 110 we gave QTH of Le Roy Waite, WPE2AK, in error; it should have been given as 39 Hannum Street, Ballston Spa, New York.

CHC Annual QSO Party Results

See W1WY's CONTEST CALENDAR this issue for complete list of 116 world-wide winners for the 2nd annual CHC/HTH QSO Party. Considering almost complete dead bands to Africa and South America, and with weak and spotty openings to other continents, the Party was an ounstanding success.



Pictured here is QSL card of Ralph Alley, W9JQE, who proves awards hunting via the mobile route also can be fun. Ralph has close to 30 awards and is now a CHCer . . . and all awards were won while he was using mobile operations. Ralph now has 350 counties worked toward USA-CA. In his mobiling he has given many other hams much sought after 'rare' counties.

Pictured above is another example of a new award promoting a club's city. The All American City Award is sponsored by Wichita Amateur Radio Club, Inc., of Kansas. To get the award you must work ten club members. Send GCR certified list (not QSLs) and 25¢ to Custodian, KØAGW, 2033 So. Parkwood Lane, Wichita 18, Kansas.

World winner was David R. Blaschke W5WZQ, who seems to be walking away with many winning scores lately. Dave racked up 520 contacts for 88,960 points for top world score, North America, United States and, of course, Texas.

High Europe score was by SP6FZ; for Africa was CN8EU; for Japan was JA2JW and for Oceania was VK5NQ.

CONTEST CALENDAR shows 116 winners. Actually there were 189 Winners for East Germany and Czechoslovakia came after the cutoff date. Additional winners are:

East Germany:

First: DM2AMG with 80 contacts for score of 4,255 points.

Second: DM2ATL with 36 contacts for score of 1,702 points.

Third: DM2ACB with 30 contacts for score of 1,651 points.

Czechoslovakia:

First: OK3EA with 42 contacts for score of 1,782 points.

Sudan:

First: ST2AR with 131 contacts for score of 14,322 points.

S.W.L. Weekly Broadcasts

According to information received from the American S.W.L. Club, they sponsor a DX Program "Calling S.W.L.s" over Station WRUL each week on Saturdays at 1830 GMT and Mondays at 2230 GMT on frequencies of 17845, 17760, 15440 and 15385 kc.

ASWLC has offered the Old Man time on the program directed toward CHC and other hunters; only thing about such opportunity, we wonder how many hams have receivers which will tune to the S.W.L. broadcast frequencies.

This brings up another situation wherein hams isolate themselves in choice of receivers which tune only to amateur bands. The spectrum is full of highly interesting and entertaining programs including those of an educational nature. The next time you walk into your shack . . . just ponder how 'narrow' your perspective.

Pictured above is CHC's 2nd Annual QSO Party award for entire world which was won by David R. Blaschke, W5WZQ who racked up 530 contacts for total score of 88,960 points.

Lost: Sponsor of an All-County Award

Reputedly the Merrimac A.R.A. sponsors a Massachusetts county award. Scores of folks have sent scores of letters to scores of QTH's; all to be returned "unclaimed". Any one know where the PR man of this club 'hides'.

Across The Border Friendship

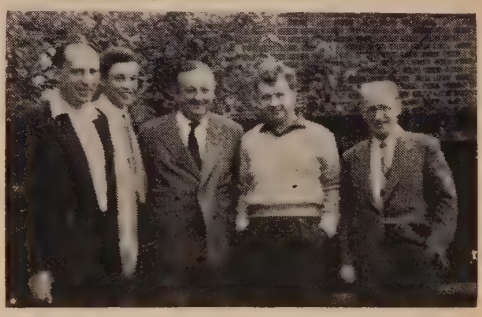
Alex Desmules, VE2AFC, has been awarded REF's Public Welfare Medal and appointed REF's Canadian Representative. Alex offers his assistance to both W/K and VE hams in any matters relating to REF (France).

New Europe CHC Chapter

CHC Chapters are forming all over the world. Latest Chapter to be announced is CHC Chapter #8 of Surrey, England.

Chas, G5GH, President writes that one unique (also for WPX) factor of membership is that G2BUL, G3FTQ and G5GH live within 200 yards of each other and for years have worked a 100% cooperative system of sharing the bands.

At the moment other members include well known DXer Bing, 5A3BC now in Lybia and who uses call G3NMQ when home; G3IFB and G3OTP



Pictured here are four well known CHC hunters who have just announced forming of CHC Chapter #8 of Surrey, England. Left to right are Alan, G3FTQ; (unknown); Chas., G5GH; Bing, 5A3BC; and Len G2BUL. See text for story.

Kentucky Joins USA-CA

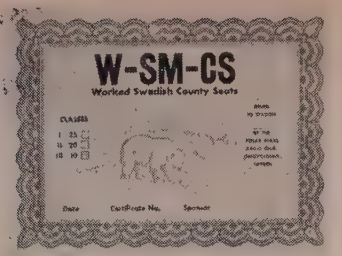
As we go to press, Dan, K4ZRA, informs us the Owensboro Amateur Radio Club, Owensboro, Kentucky, announces that club's sponsorship of three Kentucky Bluegrass Radio Awards as follows:

1. Kentucky Counties award following USA-CA lines and rules.
2. Kentucky Cities award.
3. Bluegrass Colonel award for contacting various numbers of Kentucky hams.

Dan. K4ZRA will be Custodian. Full details are being worked out and certificates printed. Further details and pictures of the awards will be carried in this column later.

Six New Swedish Awards

The USA-CA sparked idea for six new Swedish awards based on working counties, cities, prefixes and zones concept . . . word received from Polar Bears Radio Club along with sample awards says they like



Pictured above is one of six new awards sponsored by the Polar Bears Radio Club of Sweden. See story and awards rules in text. The one pictured is patterned after USA-CA for working counties.

the idea of promoting Swedish Geography. The six new awards are:

1. Worked Swedish County Seats, W-SM-CS, with classes I for 24, II for 20, and III for 10.

2. Worked Swedish Cities, W-SM-C, with classes I for 100, II for 50 and III for 20.

3. Zone 14—WPX award with classes I for 100 prefixes and 25 countries, II for 75 prefixes and 20 countries, and III for 50 prefixes and 15 countries represented.

4. The Polar Bear Award for working different areas above the Arctic Circle with classes I for 20 Areas, II for 15 Areas and III for 10 Areas.

5. Worked Scandinavian Prefixes, WSPX, in classes I for 40 prefixes, II for 30 prefixes and III for 20.

6. Worked Swedish Military Stations, WASL, in classes I for Europe stations working SL1-7, and others work 6 of 7 SL prefixes; II for working 20 different SL stations of which 5 must be SL-Z stations; III for working 10 different SL stations of which 2 must be SL-Z.

The club will provide application sheet which has all cities, counties, prefixes and countries listed, for one IRC. The awards are attractively printed on stock forms. Handling fee is 50¢ or 5 IRC. Write to PBRC, SL3ZO, c/o Awards Manager, Sven Elfving, Solgardsgatan 15, Ornskoldsvik, Sweden.

QSL and QSL Manager Problems

Be assured we will berate careless and inconsiderate QSLing practices until it appears the last dolt gets the 'word'.

Dale Strieter, W4DQS, Activities Manager for the live-wire Florida DX Club, relates his experien handling QSL requests following recent DX-P HKØAB and KS4BF. Dale reported that it took hi K4TEA and K4BVD four days to process 95% QSL requests, but took eight days to process the r maining 5% because of applicant errors. Dale stat that GMT time/date errors headed the list, and q linquents included some 'big' names in DX huntin Here's how Dale tabulates the QSLing errors in ord of frequent occurance (many applicants had multip errors):

1. Non-use of GMT for time/date (use of loc time/date). 2. GMT date errors (right time but wro GMT date). 3. Failure to compute GMT correct 4. Combination of 2. and 3. 5. Reference clocks us with time off by 10 or more minutes. 6. Dates off as much as a month or more. 7. Times off by a fact of 12 hours. 8. Not in log (very few).

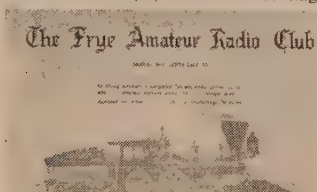
From the above, it is obvious prime QSLing erro in this case was failure to understand and use GM time/date properly.

The Old Man opines one is not a ham until one h mastered use of GMT time/date, and that swabs wh allegedly call themselves hams and then fail to u GMT, should be strung up to the good ship's yard ar as examples.

Broad Picture of United States Awards

It is gross misrepresentation and contrary to politic fact that hamdom be told amateur radio is nothi more than a selfish personal hobby privilege. Amate radio is an integral function of our society and both in the public interest and an important factor national security. In this fast moving space age, t public interest is a quantity which varies with t times and circumstances. Amateur radio's major val within a free society rests upon basis of public inte ests as related to many other associated factors

Pictured here is the Five Towns Radio Club award f working five members. The award promotes the fi towns of Hewlett, Woodmere, Cedarhurst, Lawren and Inwood from which members come. This is typical example of an award for working club me bers but which, in doing so, publicizes a loc community.



Above is the Chattanooga Choo Choo award sponsored by the Frye Amateur Radio Club, Chattanooga, Tennessee, for woking stations in the general Chattanooga Area, after January 1, 1957. U.S. stations are required to work 25 and DX stations work 10. To get the award, the Chattanooga station must be in receipt of your QSL; when required number confirmed, send list and 50¢ or 5 IRC to Club, P.O. Box 13, Chattanooga, Tennessee. For those of you who don't know your U.S. history . . . pictured on the award is the *General* made famous by Andrews Raiders. The 'Choo Choo' is on permanent exhibition at Union Station, Chattanooga, Tennessee.

In matters relating to frequency allocations, reci rocal privileges, license fees, space programs, civ defense, disaster, Citizens Band use, *etc.*, such within the domain of the public interest. Such matte are far beyond the major influence control of o League or any other such special interest group. The are Congressional-level matters as might be influenc by political and security factors and also by ma public opinion.

Through the use of awards and attendent PR, it of paramount importance that amateur radio ma every possible effort to picture itself to the public something much more than just a selfish hobby . . . must be portrayed, among other things, that amate radio is a valuable free society communications med of people-to-people which can bridge gaps of huma misunderstanding leading to better solution of many our government's and the world's ills.

[*Continued on page 100*]

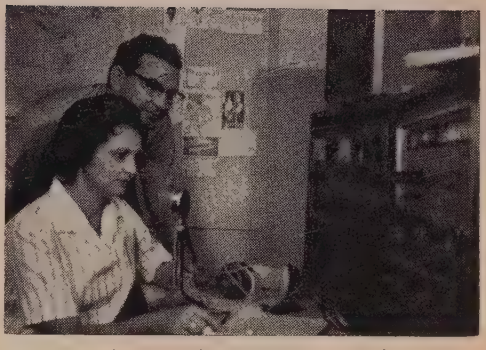
YL

BY LOUISA B. SANDO, W5RZJ
4417 ELEVENTH ST., N.W.,
ALBUQUERQUE, N. M.

ONE OF the 16 hams helping with the Polio Prevention Sundays campaign in Tucson earlier this year was W7DRU, Fran McCullough. During this campaign a mass innoculation program was conducted by the Pima County Medical Society with 38 centrally located sites throughout the County dispensing Sabin oral vaccine. Two Sundays were set aside in March, April and May for administration of Types I, II and III vaccine. Fran operated the fixed station set up at the wholesale drug warehouse which was used as a nerve center. From her post Fran directed the mobiles (including her OM George, W7SQX, and son Robert, KN7QAU), who shuttled the prepared vaccine between clinics with an excess and those running short.

As members of the volunteer communications staff of the Pima County Sheriff's Search and Rescue group, the McCulloughs often have opportunity for public service. This group became a permanent part of the Pima County Sheriff's rescue operations after hams participated in the search for three Boy Scouts lost in the snow in the Santa Rita Mtns. in Nov. '58. During a search and rescue job Fran keeps the home rig on the air to keep in touch with the mobiles and search parties, relaying information and making phone calls. She adds that someone is forever getting lost in those mountains, and that the Scouts and one hunter who was shot were the only missions to end tragically.

Fran got her license in 1956. She has done a lot of phone-patching and enjoys DX. W7DRU-W7SQX operate 10 through 80 with a DX-100, SB-10 and NC-300. On 2 meters they use the 522 and have a Two'er mobile. In addition to OM W7SQX and son Robert, WN7QAU, the McCullough's daughter Gail, age 13, is studying for her Novice. Two other jr. ops complete the family—John 16 and Lisa aged 2.



YV6AV2, Johnny, and YV2DW, Pat, at their rig in Barinas, Venezuela. Gear consists of a Hammarlund HX-500 exciting a Johnson Viking Thunderbolt, HQ-170 receiver with RME preselector, cubical quad and a TA-36 Mosley for 10, 15 & 20; also a "cats moustache" for 20, 40, 80 & 15. Members of the Radio Club Venezolano, look for them on any band, phone and SSB.

HYLH Award

YL-CHC-Chapter No. 4 has decided upon the certificate it will offer and has named it "Hunt the YL Hunters Award"-HYLH. Certificate custodian is KØRGU, Tillie. Available to all hams, there are seven different classes of the award, with 12 endorsements (6 for band and 6 for mode), each being considered a separate achievement Class G is for contacts with any 25 members of YL-CHC-Chap. No. 4 (DX, any 20). For other classes of the award and complete rules check K6BX's USA-CA Program department elsewhere in *CQ*.

August *CQ* carried a full write-up on the

Members of the Upper Peninsula YL club modeled "Easter bonnets" at their spring meeting. Each YL was assigned to make a hat for another member of the club; no one knew who was making whose hat. Only stipulation was that the hat had to have a bearing on ham radio and reflect in some manner the personality of the one for whom it was intended. L. to r., seated: W8JXJ, Vi; K8CZO, Mary Jane; W8HAV, Zelma; Zelma's daughter Judy, K8OOY. Standing K8ILN, Myriam; K8TGX, Merle; Merle's twin sister Muriel; K8YEE, Jeanne; K8PNA, Faye; K8VDT, Gail. Don't we gals have fun!

23rd YLRL Anniversary Party

Time: CW—Start—October 24, 1962, 1200 EST (1700 GMT)
End—October 25, 1962, 1800 EST (2300 GMT)
Phone—Start—November 7, 1962, 1200 EST (1700 GMT)
End—November 8, 1962, 1800 EST (2300 GMT)

Eligibility: All licensed YL and XYL operators throughout the world are invited to participate. YLRL members *only* are eligible for the cup awards, non-members will receive certificates. *Only YLRL members* are eligible for the Corcoran Award. Contacts with OMs will not count.

Operation: All bands may be used. Cross band operation is not permitted. Only one contact with each station will be counted in each contest.

Procedure: Call "CQ YL"

Exchange: Station worked, QSO number, RS or RST, ARRL Section or country. Entries in log should also *show* the time, band, date, transmitter and power. Please know your own ARRL Section or country. (Section list available for SASE.)

Scoring: a) C.w. and Phone sections will be scored as separate contests, Submit *separate logs* for each contest.
b) Multiply number of contacts by total number of ARRL Sections and countries worked.
c) Contestants running 150 watts input or less at all times may multiply the results of (b) by 1.25 low-power multiplier).

Awards: Highest c.w. score—gold cup. Highest phone score—gold cup. Highest phone log and c.w. log in each *district* and country will receive a certificate. Highest *combined* phone and c.w. score, YLRL member only, will receive Corcoran Award.

Logs: Copies of all logs must show claimed score, be *signed* by the operator and postmarked no later than Nov. 22, 1962 and received no later than December 6, 1962, or they will be disqualified. Send copies of logs to: K2JYZ, Lillian Byrne, 24 Stillwell Pl., Freeport, L.I., N.Y. No logs will be returned. Be sure it is a *copy* of log you send for confirmation.

YL CHC Chapter, including a list of members. Inadvertently omitted from that list were charter members K5BNQ, Doris, CHC 96 (see *CQ* Mar. '61, p. 93 for pix) and K6OQD, Jean, CHC 26 (see *CQ* Jan. '60, p. 93). New members since then: K1IJV, Jean; K1LCI, Ginny; W5DVV, Shirley; WA6MAZ, Marcia; KØWEN, Lou. GH (good hunting), as the CHC'ers say!

W7DKU, Fran, a member of the volunteer communications staff of the Pima County Sheriff's Search and Rescue group at Tucson, Ariz.

WØVGE, Becky Jain, subject of a CQ cover and write-up in Jan. '56, became Mrs. Jerry Kersenbrock last April. Jerry is not a ham, but with Becky's station set up at their wheat and cattle farm in Kansas he may soon get interested. Becky's dad is WØLOW. She operates 10 through 80 using a Viking II with vfo and HQ-170.

AWTAR

The radio net for the 1962 AWTAR, held July 7-11, was in full operation on s.s.b. with these chairmen at 12 stops across the country: W6FEA, Oakland; W6WUG, Fallon, Nev.; W7QYK, Elko, Nev.; K7FCN, Salt Lake City; K7ELH, Rock Springs, Wyo.; WØVOR, Scottsbluff, Neb; WØDLL, Grand Island, Neb.; WØMJH, Des Moines; K9IUI, Peoria; W8ENH, Dayton; W3LFQ, Pittsburgh; K3EMT, Wilmington, Del.

W3GTC, Carolyn, AWTAR net chairman for the 5th year, operated with the First State Radio Club at Wilmington, terminus of the race. At Oakland W6FEA, Gertie, was assisted by W6QGX, Harryette, and W6HHD, Teresa. Harryette flew up to Oakland for the Powder Puff Derby for her first cross-country solo, flying up the coast and back through the San Joaquin Valley. (You'll be flying in the Derby yet, Harryette!)

12th Midwest YL Convention

The 12th Annual Midwest YL Convention held at Flint, Mich. in May brought together 53 YLs for the luncheon, and 96 (including OMs) for the banquet. Unique table decorations for the luncheon were a cup and saucer at each plate, hand painted by K8OMH. Pearl with the call of the individual YL, and the cup filled with mints. There were prizes for all and chairman W8ATB, Esther, was presented with a gift. At the business meeting the Upper Peninsula YL Club invited all YLs to attend the 13th Midwest YL Convention to be held June 23, 1963 on the River Boat with headquarters at Newberry, Mich.

[*Continued on page 102*]

GOTHAM VERTICALS DELIVER THE CONTACTS

IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a $16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida
Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gabbert, K6INI (Ex-TI2TG)

V-80 VERTICAL ANTENNA

FACTS

- If K6INI can do it, so can you
- Absolutely no guying needed.
- Radials not required.
- Uses one 52 ohm coax line.
- No relays, traps, or gadgets used.
- Special B & W loading coil
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.

ANNOUNCEMENT!!

We proudly announce our appointment as franchised dealer in all leading TRANSMITTERS and RECEIVERS.

We feature a unique plan that absolutely guarantees proper installation and operation. ORDERS and INQUIRIES SOLICITED.

DO YOU KNOW

1. YOU WILL HAVE NO DIFFICULTY INSTALLING YOUR GOTHAM VERTICAL ANTENNA IN JUST A FEW MOMENTS, REGARDLESS OF YOUR PARTICULAR PROBLEM, SO ORDER WITH CONFIDENCE EVEN IF YOU HAVE RESTRICTED SPACE OR A DIFFICULT SITUATION.

2. LOADING COIL NOT REQUIRED ON 6, 10, 15 AND 20 METERS. FOR 40, 80, AND 160 METERS, LOADING COIL TAPS ARE CHANGED MANUALLY EXCEPT IF A WIDE-RANGE PI-NETWORK OUTPUT OR AN ANTENNA TUNER IS USED; IN THIS CASE BAND CHANGING CAN BE DONE FROM THE SHACK.

3. EVERY GOTHAM ANTENNA IS SOLD ON A TEN DAY TRIAL BASIS. IF YOU ARE NOT FULLY SATISFIED, YOU MAY RETURN THE ANTENNA PREPAID FOR FULL REFUND OF THE PURCHASE PRICE. THIS IS YOUR GUARANTEE OF FULL SATISFACTION.

FILL IN AND SEND TODAY!

Airmail Order Today — We Ship Tomorrow

GOTHAM Dept. CQ
1805-A PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

☐ V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS. ESPECIALLY SUITED FOR THE HAM WHO OPERATES 40 AND 15 ..... $14.95

☐ V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS $16.95

☐ V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO $18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

Name_____

Address_____

City_____ Zone ____ State_____

For further information, check number 20, on page 110

the fabulous
HAMMARLUND
HX-50

COME SEE...
COME BUY...
THE NEWEST
AND THE BEST

ONLY
$399.50
Amateur Net

AMATEUR RADIO EQUIPMENT CO.

1203 E. Douglas

Wichita, Kansas

For further information, check number 21, on page 110

CHANGING QTH?

Send change of address notice six weeks beforehand to CQ Magazine, 300 W. 43rd St,. New York 36, New York.

GET 'EM WHILE THEY LAST
CQ 1961
Bound Volumes
$15
Handsome Binding
Order Your
Copy Now
CQ MAGAZINE
300 WEST 43rd ST.,
NEW YORK 36, N. Y.

NEW MECHANICAL FILTERS
455 Kc 2.0 Bandwidth
$25.00 POSTPAID U.S.A.
Denson Electronics
Rockville, Connecticut

G.d.o. & Z-Bridge [*from page 50*]

from the tank increases. Note also that there is no dip at all for some positions of the g.d.o. The g.d.o. will dip with its coil crossing a wire connecting the tank coil and the tuning capacitor, but will not dip strongly with the length of the g.d.o. paralleling the same wire. This exercise shows that the g.d.o. couples into the tank circuit by magnetic coupling, and also gives the experimenter a pretty good idea of the shape of the magnetic field.[2]

EXERCISE #3. Parallel-connect a 470 ohm composition resistor across the tank circuit, and check again for dips. Note that the g.d.o. must be moved much closer for the same depth of dip experienced in Excercises 1 and 2. The tank circuit Q has been decreased, requiring much closer coupling to transfer power out of the g.d.o. into the tank.[3]

EXERCISE #4. Turn on the station receiver, and tune to a known frequency, such as 5, 10, or 15 mc for the WWV broadcast. Tune the g.d.o. (with the proper coil inserted) until a low pitched whistle is heard beating against the incoming signal. Note that there is a difference between the standard frequency transmitted by the National Bureau of Standards and the indication on the dial of the g.d.o. For this reason, the Knight-Kit g.d.o. hairline may be moved. When the dial is moved to agree with this or any other standard close to the frequency of interest (such as the edge of the ham band as shown on a fair station receiver) the dial calibration of the g.d.o. becomes much more accurate. The lesson of this experiment is that the calibration of even the best g.d.o. should not be depended on for close frequency measurement, but should be checked with the station receiver or a more accurate standard.

EXERCISE #5. An unknown capacitance may be measured with the g.d.o. Attach a pair of alligator clips to the leads of the capacitor. With the Blue coil (whose inductance is 6 microhenries) out of the g.d.o. socket, the unknown capacitance may be connected, by the clips, to the bare pins of the coil to form a resonant circuit. Check the resonant frequency of the combination using the lower-frequency (Red or Violet) coils of the g.d.o. (The Red coil is 200 microhenries, the Violet, 40.) From the equation, $C = 1/39.4\ f^2L$, the unknown capacitance may be calculated.[4] (C is in farads

[2]A bonus of this exercise is that it shows where the strongest energy fields of the tested coil are. It is generally bad to locate a shield or component part (including circuit wiring) in these areas.

[3]The g.d.o. measures the power circulating in the g.d.o. tank. The "dip" is caused by power being taken out of the g.d.o. tank. Since the g.d.o. power exists at a particular frequency, a dip indicates a nearby resonant circuit at that frequency.

[4]Users of the Knight-Kit g.d.o. do not have to make this calculation. A chart of inductance, capacitance, and the corresponding frequency is included in the g.d.o. instruction book.

f in cycles per second, and *L* in henries.) If the unknown capacitance is less than 50 mmf, a known (or second Blue) coil must be used, for the frequency will fall within the tuning range of the Blue coil. It is not possible to use a single coil in the resonant circuit and in the g.d.o. at the same time.

EXERCISE #6. Connect a known capacitor across an unknown coil. Measure the resonant frequency. Reversing the positions of *L* and *C* in the equation of Exercise 5 enables you to calculate the inductance. While this method is not the most accurate possible, it is sufficient for most amateur use. The nomograph in the Knight-Kit g.d.o. instruction book may again be used as in Exercise #5.

EXERCISE #7. Wind a turn or so around the coil of your resonant circuit of Exercise #1. Similarly wind a few turns around the g.d.o. coil, or install the pickup link used to couple the g.d.o. to the *Z*-Bridge. Connect the two links together. Tune the g.d o., and note that the g.d.o. dips through the links. The exercise shows how the resonant frequency of a circuit that can't be reached with the g.d.o. can be measured.

EXERCISE #8. To check transmitter neutralization, disconnect only the plate and screen high voltage supply to the final amplifier. (Note: Some power supplies rise to dangerous voltages when the final is not connected, so resistive loading of the supply may be necessary. It is *always* necessary to observe safety precautions when working around a transmitter power supply.) Connect the g.d.o. pick-up link to the output jack of the transmitter, slipping the link over the proper g.d.o. coil (inserted) for the band on which neutralization is to be checked. Turn the g.d.o. gain control fully counter-clockwise, turning off the g.d.o. plate supply *without* clicking the switch. Now the cathode and grid of the g.d.o. act like a diode detector. Turn the oscillator and driver stages of the transmitter on and tune the g.d.o. for maximum meter indication. If the meter reads upscale more than one or two small divisions, the final amplifier is not exactly neutralized. If the amplifier has neutralizing controls, they can be adjusted for minimum g.d.o. reading. Good neutralization permits both input and output controls of the amplifier to be set practically anywhere with no driver stage r.f. reaching the g.d.o. (There are other methods of neutralizing; each has its advantages.)

EXERCISE #9. Purchase a composition 51 ohm 5% resistor. Connect it to the load terminals of the bridge. Throw the control box function switch to DET and turn the detector gain up halfway. Using the pick-up loop and the Blue coil in the g.d.o., connect the coax connector of the pick-up loop to the INPUT terminal jack of the *Z*-Bridge. Increase the g.d.o. GAIN control until

BILL SLEP COMPANY

301 Highway

Ellenton, Florida

For further information, check number 22, on page 110

"Your Friendly Supplier"

OFFERS

THE LARGEST INVENTORY
of USED EQUIPMENT in the
NORTHEAST. SEE SAMPLES BELOW.

Central Electronics 20A	149.95
Collins 32V1	225.00
" 32V2	275.00
Globe 90A $44.95; w/New Style Cabinet	49.95
" 300A	269.95
" LA-1	79.95
Gonset G-28 10 Meter Comm.	199.00
" GSB-101	275.00
Hallicrafters SX-99	99.95
" SX-100	199.95
" SX-101 Mk I	249.00
" SX-101 Mk III	269.00
Johnson Courier	174.95
" Pacemaker	275.00
National HRO-60 w/coils	389.00
" NC-183	149.00
" NC-183D	239.95
Tapetone ±345 SkySweep	164.95

WRITE FOR LATEST COMPLETE LIST

Evans RADIO

P.O. BOX 312 FONE 603-22-53358 CONCORD, N. H.

For further information, check number 23, on page 110

the fabulous
HAMMARLUND
HX-50

COME SEE...
COME BUY...
THE NEWEST
AND THE BEST

ONLY
$399.50
Amateur Net

BRUCE ELECTRONICS

1120 E. Capital Avenue

Springfield, Illinois

For further information, check number 24, on page 110

HEY!
WE WANT YOUR
OLD RECEIVER

We will allow in trade for good used receivers as follows:

Halli S38E	$ 75	Hamm HQ129X	$150
Halli S108	150	Hamm HQ140X	175
Halli SX110	170	Hamm HQ100	160
Halli S85	125	Hamm HQ110	225
Halli S99	150	Hamm HQ160	250
National SW54	65	National NC88	110
National NC60	80	National NC98	135
National NC125	150	National NC188	120
National NC173	135	National NC109	145
National NC183D	200	National NC240D	125

(If your receiver is not listed, please ask for SPECIAL QUOTE)

TOWARDS THE PURCHASE
OF THE NEW HALLICRAFTERS
SX101A at $445.00 AMATEUR NET

GRAHAM RADIO INC.
AMATEUR DEPT. C
505 MAIN ST. READING, MASS.
TEL. 944-4000 (AREA CODE 617)

For further information, check number 25, on page 110

the meter just reads zero with the Z-Bridge dial adjusted to 72 ohms. Swing the impedance bridge dial and note the sharp meter peak in the vicinity of 52 ohms. (If there is stray r.f., the peak may not be very sharp. For minimizing stray pickup, solder the resistor inside of a PL-259 connector. (The same stunt works well with the 72 ohm standard resistor allied furnishes with the Z-Bridge.) Remember that the Z-Bridge GND should be connected to the control box COM, and the Bridge NULL should go to +DET.

EXERCISE #10. Substitute your antenna for the load resistor of Exercise #9. Find its resistance, *reducing* the g.d.o. GAIN and *increasing* the control box GAIN as necessary. A good peak means a resistive or nearly resistive load. If neither gain control has required touching and the bridge dial is critical in its position, the peak is "good."

EXERCISE #11. If the peak of Exercise #10 was poor, parallel the load with a variable capacitor. A coaxial T adapter (M-358, Amphenol 83-IT) is useful here. See if any setting of the capacitor gives a better "peak." (Remember this "peak" is the way the bridge null is displayed.) If the capacitor degrades the peak, an inductor is called for. Variable inductors are handy, though expensive.[5]

EXERCISE #12. If the station antenna is fed through a balun, repeat Exercise #10, with the bridge connected to the transmitter side of the balun. If the null is poor (poor peak), repeat Exercise #11, looking into the balun.[6] (Baluns get their name from their use in feeding balanced loads from unbalanced lines. They sometimes are also used for stepping impedance up or down.)

EXERCISE #13. The output circuits of transmitters can be adjusted to present a desired load to the final amplifier plate without turning the transmitter on. Make up a group of series-connected composition resistors that total the desired plate load impedance. Connect this combination plate-to-ground (plate-to-plate in a push-pull amplifier), and connect the transmitter output jack to the Z-Bridge load terminals. All other connections are as in Exercise #9. Set the bridge dial to the desired transmitter output impedance and tune the g.d.o. to the desired transmitter operating frequency. Adjust the final amplifier plate tuning and loading controls until a good "peak" (bridge null) is obtained. The bridge setting should always be at the transmitter output line impedance for the last adjustment, though it may

[*Continued on page 88*]

[5]Geiser, D., "How Kit Transmitters Work, Part 2," *CQ*, March 1962, page 39.
[6]Baluns usually add a small reactive component, so probably a pure resistance on the load side will appear somewhat reactive on the input side.

TEST EQUIPMENT

Freq. Meter—BC221 or LM, with orig. cal. book	$ 59.00
Freq. Meter—as above with 115v a.c. supply	69.00
Freq. Meter—Navy LM type, less cal. book	29.00
Sig. Gen.—Ferris 18B—$39.00, Ferris 10B	29.00
Sig. Gen.—Triplett #3433, AM-FM, 100kc-120mc	65.00
Sig. Gen. Hickok 188X, AM-FM 100kc-110mc	65.00
Sig. Gen. Eico type 315, 75kc-150mc	35.00
Scopes—Dumont #241—$75.00, #224A—$50.00, #208	59.00
Scopes—W.E. TS-34A or #80—$45.00, Heath 5 inch	24.00
Browning Labs—ON-5, 5 inch oscillosynchroscope	95.00
Scope—Tektronix type 512, 5 inch	225.00
Tube Checker—RCA WT-110A, automatic card type	110.00
Tube Checker—Hickok model TV-8B/U	85.00
Sweep Calibrator—Browning Labs, GL-22A	50.00
General Radio—#650A Impedance bridge	125.00
General Radio #916A Radio Freq. Bridge	150.00
General Radio #700A, 50 cy—5mc SIG. GEN.	75.00
G.R.—#P522A Sig. Gen. 250-1000mc	125.00
Sig. Gen—Measurements Corp Model 80	195.00
Sig. Gen. Measurements #75, 50-400 mc	125.00
Q Meters—models 160A and 170A	150.00
Esterline-Angus-model AW recorder	125.00
Hewlett Packard #502A, high speed diode scaler	125.00
Dumont #215 low freq. linear time base generator	65.00
Freq. Meter—TS—173/UR, 90-450 mc	125.00
Freq. Meter—TX—175/UR, 85-100mc	125.00
Sig. Gen. URM-25D, 10 Kc to 50mc., like new	250.00

TRANSMITTERS & RECEIVERS

B&W 5100-S	$195.00
Viking Mobile	65.00
Heath DX-100	145.00
Johnson Viking I	95.00
Globe Chief Deluxe	59.00
Sonar SRT-120 & VFO	75.00
Heath DX-40	55.00
Viking Adventurer	35.00
EICO — 720	65.00
Globe Scout 680	59.00
RME #4350 with Calib	$165.00
Hammarlund HQ-140	169.00
Harvey-Wells R9A	75.00
S-106, 6 mtr.	35.00
National NC-98	79.00
Hammarlund HQ129	129.00
S-108, .54-34mc.	99.00
S-85 Receiver	80.00
RBM or RBS, 115v.	59.00
HRO and 4 coils	85.00

ELMAC PM R-8, AF-67 and M-1070 supply $235.00
Gonset communication monitor, 132-152mc 75.00
Harvey-Wells Bandmaster Deluxe, less 2 MTR. 49.00
Eldico SSB 500, 500 watt linear, 80 thru 10 ..... 195.00
Collins mechanical filter, type F-455 D-31, new 35.00

All of the above equipment is in good working condition. .....

MISC.

Variac—5 amp.—$9.95, 10 amp.—$14.95, 18 amp.	$24.00
TBS transmitter, 100w, 60-80 mc, 6 mtr.	35.00
Code Keyer TG-34A	24.00
ARC-5, 2 mtr. Xmitter, new	24.00
TCS xmitter, receiver & 12 v. supply	75.00
RCA AVT-15A, AVT-112A, 80 mtr. Xmitter	18.00

Prices are based on fair relative values. Avoid delay—enclose sufficient postage, excess will be returned. FOB Hempstead. 25% with COD orders.

ALGERADIO ELECTRONICS CO. •

37 Greenwich Street
Hempstead, New York
Phone IV 9-0808

For further information, check number 26, on poge 110

BOOST RECEIVER SENSITIVITY TO 10 TIMES!

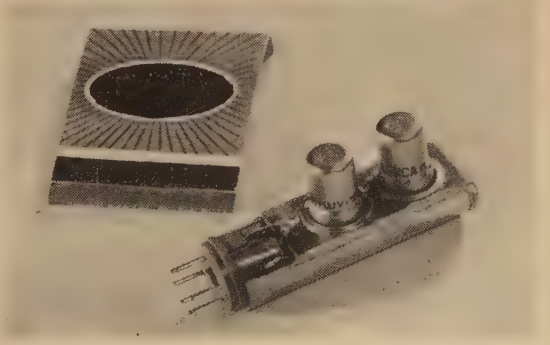
The NEW Raytronics NUVISTAPLUG gives up to 25 db gain when inserted in the RF amplifier tube socket of any receiver (CB, Ham, TV, FM, etc.). Cuts noise figure from about 6 db to less than 3 db. No wiring or circuit changes! Replaces directly in socket of any 7 pin pentode RF amplifier. Warrantied for 90 days! When ordering, state type of tube the NUVISTAPLUG will replace (6AU6, 12AU6, 12BA6, 6CB6, 6BZ6, 6DC6, 6DB6, etc.). Money back guarantee if you are not satisfied.

ONLY $17.95

postpaid

(No C.O.D.'s)

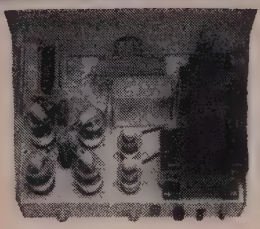
See page 26 Sept. CQ for a review of the NUVISTAPLUG.



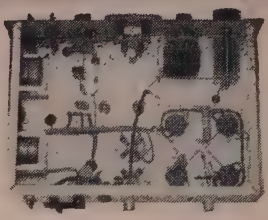
RAYTRONICS

% CQ MAGAZINE
300 West 43rd Street
New York 36, N. Y.

YOU CAN'T BEAT THIS KIT FOR VALUE!



P&H LA-400C LINEAR AMPLIFIER
800 WATTS PEP
ONLY $179.95*



IT'S EASY TO ASSEMBLE AND WIRE — QUALITY THRU AND THRU

The P&H LA-400-C is not an ordinary kit, because a lot of the assembly has already been done for you. The plate transformer, filter choke, plate tuning capacitor etc. are mounted. Plate coil and band switch are assembled and mounted. Output loading capacitor network is assembled; in fact — about all you have to do is mount small parts, mount sockets and finish the wiring. As for performance — just ask anyone who uses an LA-400-C. Just compare his signal with the so-called "talking kilowatts" — it will be mighty hard to tell 3 DB difference. The difference in cost will pay for a good scope, plus a top notch receiver. One other point — Where else can you get a warranty such as P&H gives you on the LA-400-C ?

ONE YEAR WARRANTY ON ALL PARTS AND TUBES !

The 80 thru 10 meter band-switching pi network is designed for 800 watts PEP SSB, 400 watts CW, FM or FSK and 230 watts Linear AM (controlled carrier) or 185 watts (constant carrier) with 50-70 ohm output. Popular 100 watt SSB exciters require no swamping or matching networks to drive the low Z untuned input. Grounded grid circuit uses four 1625's or 837's on customers request. Meter reads RF drive, plate current, RF amps output. New modern compact 9" X 15" X 10½" gray cabinet also contains power supply using 816's. TVI suppressed, Parasitic Free.

* Prices effective June 15, 1962

LA-400-C Wired & Tested $219.95
Slightly higher West of Rockies.

P&H ELECTRONICS INC.
424 Columbia • Lafayette, Ind.

For further information, check number 28, on page 110

KH6AR
Wahiawa, Oahu, Hawaii
reports:

"most natural sounding SSB mike yet"

We'll let Ken Bryan's (KH6AR) letter to us speak for itself:

"I've been using my Shure 440SL on regular skeds with people who know my voice from eyeball QSO. That includes my daughter who doesn't ordinarily like the tone of sideband. Everybody tells me that it's the most natural sounding SSB mike yet . . . especially my daughter.

"The pick-up is great. The tendency of local splatter and unwanted sideband is *considerably* reduced over three other mikes I compared it with. Humidity doesn't affect it at all. All in all, I feel it's the best SSB mike I've ever had, including one that cost me over $50.00!"

ONLY **$28.50** net

(complete with stand, grip-to-talk switch, 7 ft. highest quality 2 conductor shielded cable.)

A87K Modification Kit. *Instant switching from VOX (with muted microphone position) to push-to-talk. $3.25 net.*

SHURE 440SL

CONTROLLED MAGNETIC SSB, AM, FM MICROPHONE

Literature: Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Illinois

For further information, check number 19, on page 110

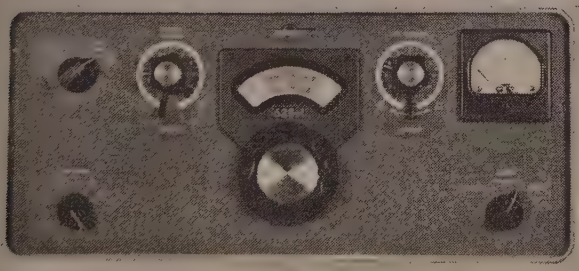
NEW

By

COLLINS

From

HARVEY RADIO



COLLINS NEW 62S-1 VHF CONVERTER

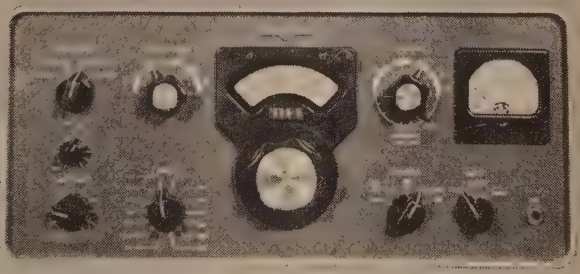
Doubles your present frequency coverage with full 6 and 2 meter operation. Covers 49.6 to 54.2 mc and 143.6 to 148.2 mc. ■ ALC built in ■ Switch from HF to VHF, from 6 to 2 all from the front panel — no cable changing ■ No need to buy extra crystals ■ Fits CC-2 suitcase ■ Uses high voltage from 32S-1 or KWM-2 power supply — 160 watts PEP ■ **Available in December!** Order now for early delivery ■

Amateur Net **$895.**

COLLINS NEW 32S-3

Real value for the discerning Ham . . . It features keyed carrier on CW ■ Adjustable keying hardness control ■ A zero-beat spotting control ■ ALC ■ Easier access to patch cords ■ Sidetone level adjust ■ For SSB or CW ■ Have the cleanest signal on the air ■ Order now for October delivery ■

Amateur Net **$750.**



Take a tip from Harvey . . . trade up to Collins quality and performance today. Collins means high value . . . more amateur pleasure!

hrc **HARVEY** ESTABLISHED 1927 **RADIO CO., INC.**

103 West 43rd Street, New York 36, N. Y./JUdson 2-1500

Visit our new subsidiary, **FEDERAL ELECTRONICS, INC., Vestal, N. Y.,** for all your industrial needs.

For further information, check number 29, on page 110

Ready Right Now!

the fabulous HAMMARLUND

HX-50

COME SEE...
COME BUY...

THE NEWEST AND THE BEST

ONLY $399.50 Amateur Net

C & G ELECTRONICS

Northwestern headquarters for Collins

2502 Jefferson Avenue — Tacoma 2, Wash.

2221 3rd Avenue — Seattle 1, Wash.

For further information, check number 80, on page 110

WALKIE-TALKIE RADIOPHONES

FROM $59.98

Send for FREE literature on the complete line of VANGUARD radiophones, for industry, Civil Defense, CAP, Citizens and Amateur bands. Made in the U.S.A. and guaranteed 5 years.

VANGUARD ELECTRONIC LABS.
190-48 99th Ave., Hollis 23, N. Y.

Dept. CA-10

10,000 Things Electronic to Enjoy
10,000 WAYS TO SAVE

Send For RADIO SHACK's 1963 Electronics Catalog

FREE For you and two friends.

Get everything you need in electronics in this new 284-page catalog —Hi-Fi equipment, radios, tape recorders, tapes, records, tubes, test equipment and thousands of others —all at money-saving prices and no money down credit terms. Satisfaction guaranteed or money back.

RADIO SHACK CORP. Boston 17, Mass.

MAIL COUPON TODAY

Without obligation send me your NEW catalog: FREE & POSTPAID

Your Name_____

Address_____ 62K21

City_____ Zone_____ State_____

Fill in names of two interested friends.

Name of a friend_____

Address_____ 62K21A

City_____ Zone_____ State_____

Name of a friend_____

Address_____ 62K21B

City_____ Zone_____ State_____

G.d.o. and Z-Bridge [*from page 84*]

be moved off this setting to find which way to "go." Unclip the resistor string and the final is ready to go. If greatest accuracy is desired during this adjustment, use deposited-film resistors, and keep leads short.[7]

EXERCISE #14. The advanced amateur may want to make low-loss matching networks using coaxial cable instead of coils and capacitors. One of the most difficult parts of such work is to determine the actual electrical length of a piece of coax cable. The best cable-making machine will allow some variation from yard-to yard, so the 0.65 propagation velocity factor is only an average figure. To find a better figure for your tuning stub, short one end of the particular piece of coax you intend to use (the other end open) and measure the resonant frequencies at the shorted end, inductively coupling the g.d.o. into the single wire that makes the short. Start with the lowest g.d.o. dip, and work up in frequency until you pass the frequency you intend to use. Resonance is indicated every *odd* ¼ wave, so the lowest-frequency resonance on cable lengths less than 100 feet will probably be at that wavelength where the coax is electrically ¼ wave length long. The cable measures much less actual length. (1 meter = 39.37 inches) The proportions of this shortening are most accurate at those resonances bordering the frequency of interest. Average the shortening factors found at these bordering frequencies, and use this factor to convert from the desired electrical wavelength in meters to the actual length to cut the cable.

More references to both the possible measuring and application techniques will be found in footnote 8.

EXERCISE #15. To use the g.d.o. as a field-strength meter, turn the g.do. gain to minimum and slip the pick-up link over the coil that tunes the frequency range of interest. Connect a *short* antenna to the center conductor, and tune the g.d.o. for maximum meter indication. This sets the g.d.o. on the transmitter frequency. Adjust the transmitter tuning for maximum indication on the g.d.o. This is the adjustment for maximum transmitter output. Remember that the transmitter antenna (not the rig) should be the radiation source.

---

[7]This method works because the network that steps desired plate impedance down to the antenna or line impedance will likewise step down the impedance of the resistor string.

[8]Bane, C. F., "About Grid-Dip Oscillators," *CQ*, March 1947, page 13.
Scherer, W. M., "The Dipper," *CQ*, May 1947, page 15.
Scherer, W. M., "Building and Using the Antennascope," *CQ*, September 1950, page 13.
Scherer, W. M., "Further Notes on the Antennascope," *CQ*, November, 1950, Page 28.
The above references are contained in the *CQ Anthology*, cat. no. 102-1, Cowan Publishing Corp., 1958.
Johnson, *Transmission Lines and Networks*, McGraw-Hill, New York, 1950.

Terry's Overstocked!

Get a fabulous, fantastic deal now on brand new factory fresh Hallicrafters gear! Terry's in a trading mood . . . so let's make a deal!

YOU CAN'T BEAT TERRY'S TERMS!

$5 DOWN-3 YEARS TO PAY

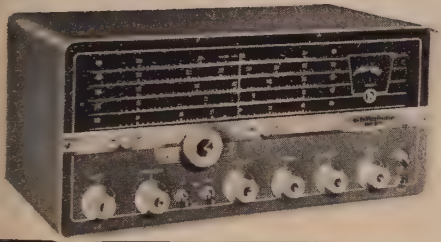
This is the place to come for late serial number Hallicrafters gear. We're overstocked, which is the exact reason why we're making trade-in deals you simply won't believe—but we'll stick by them. Order from this ad . . . use coupon below . . . take advantage of our famous "stay on the air" plan.

$5 down is all it takes!

SX 101A OVERSTOCKED

Your trade in comes off the price!

$445 HAM SET **$15.89 A MONTH (3 YEARS)**



SX-111 — OVERSTOCKED!

Time for a new receiver! Get our deal! Be amazed! $5 down.

$279.50 HAM SET **$9.91 A MONTH (3 YEARS)**

NEW HALLICRAFTERS EQUIPMENT

	Price	Monthly Payments
CRX-1 Recvr.	$ 99.95	$ 3.42
CRX-2 Recvr.	109.95	3.79
CRX-3 Recvr.	94.95	3.24
FPM-200 Mob. Transcvr.	2650.00	95.51
HA-1 Keyer	79.95	2.70
HA-2 2-Meter Transvtr.	349.50	12.44
HA-5 VFO	79.95	2.70
HA-6 6-Meter Transvtr.	349.50	12.44
HT-32B Xmtr	725.00	26.00
HT-33B Xmtr	995.00	35.75
HT-37 Xmtr	495.00	17.69
HT-40 Xmtr	109.95	3.79
HT-40K Xmtr	89.95	3.07

Terms above apply to three-year contract. Minimum order financed for 1 year, $60; 2 years, $120; 3 years, $180. Persons signing time-pay contracts must be 21 or over and employed. Serviceman's applications accepted.

	Price	Monthly Payments
HT-41 KW Lin.	$ 395.00	$14.08
P-26 Sup for above	99.50	3.41
R-47 SPKR.	12.95	.29
R-48 SPKR.	19.95	.54
S-108 Recvr.	139.95	4.87
S-118 Recvr.	99.95	3.42
S-119 SWL Recvr	49.95	1.62
S-119K Kit	39.95	1.26
S-120 Recvr.	69.95	2.35
SX-62A	430.00	14.08
SX-100 Recvr.	325.00	11.56
SX-101A Recvr.	445.00	15.89
SX-110 Recvr.	169.95	5.86
SX-111 Recvr.	279.50	9.91
SX-115 Recvr.	599.95	21.48
SX-140 Recvr.	124.95	4.33
SX-140K Recvr.	104.95	3.61

WRITE FOR OUR LATEST LISTING. 10% DOWN—up to one year to pay on $60.00 order, two years on $120.00 order and three years on $180.00 order—$5.00 deposit to hold—Subject to Prior Sale.

Hallicrafters Reconditioned Equipment
Top condition — Satisfaction guaranteed

HT-18 VFO	$ 29.00	S-106 Recvr.	$ 29.00
HT-31 Linear	128.00	S-107 Recvr.	67.00
HT-32 Exciter	369.00	S-108 Recvr.	109.00
HT-32A Exciter	429.00	S-120 Recvr.	49.00
HT-32B Exciter	495.00	SP-44 Panadaptor	39.00
HT-33A Linear	399.00	SX-24 Recvr.	59.00
HT-40 Trans.	64.00	SX-42 Recvr.	149.00
S-38E Recvr.	39.00	SX-62 Recvr.	159.00
S-40 Recvr.	59.00	SX-62A Recvr.	269.00
S-43B Recvr.	69.00	SX-71 Recvr.	119.00
S-53A Recvr.	49.00	SX-100 Recvr.	189.00
S-76 Recvr.	99.00	SX-101 Recvr.	219.00
S-77 Recvr.	49.00	SX-101 Mark III Recvr.	249.00
S-85 Recvr.	79.00	SX-110 Recvr.	129.00
S-94 Recvr.	29.00	SX-111 Recvr.	179.00
S-95 Recvr.	39.00	SX-140 Recvr.	99.00
S-102 Recvr.	29.00		

10% DOWN—up to 3 Years to Pay!

Stay on the Air

Why go off the air? Deal with Terry and you use your trade in until your new equipment arrives at your shack!

HA-1 Keyer $79.95 Ham Set only $2.70 a month (3 years)

FLORIDA HAMS — *See us in person at our new location,*
AMATEUR ELECTRONIC SUPPLY, 23 Azalea Park Shopping Center, Orlando, Florida

AMATEUR ELECTRONIC SUPPLY

Two Stores to Serve You
PLEASE SEND MAIL ORDERS TO MILWAUKEE STORE

MANAGER, STEVE, W9EAN

MILWAUKEE, WISCONSIN
3832 Lisbon Avenue
Phone: WEst 3-3262

MANAGER, "DOC", W9HJS

CHICAGO, ILLINOIS
6450 Milwaukee Avenue
Phone: ROdney 3-1030

Amateur Electronic Supply—Mail Order Dept. C-105
3832 W. Lisbon Ave., Milwaukee 8, Wisc.

Ship me .....
I enclose ..... : I will pay the balance in

☐ 1 year ☐ 2 years ☐ 3 years

I want to buy ..... and want to trade .....
What's your deal?

Name .....

Address .....

City ..... State .....

☐ Send Latest Free Reconditioned equipment bulletin.

For further information, check number 31, on page 110

Ready Right Now!

the fabulous HAMMARLUND

HX-50

COME SEE...
COME BUY...

THE NEWEST AND THE BEST

ONLY $399.50 Amateur Net

Davis Electronic Supply Co., Inc.

1735 No. Acadian Thruway

Baton Rouge, La.

For further information, check number 32, on page 110

DOW-KEY DK60 SERIES

4 VERSATILE MODELS A.C. or D.C.

COAXIAL RELAYS

Small, Compact, Light Weight, Less than 9 oz.

Also Available with Type C, TNC, BNC, N & UHF Connectors

Outstanding favorite for amateurs . . . Versatile combinations for industrials! Low VSWR — less than 1.15:1 from 0 to 500 mc. LOW LOSSES . . . High Contact Pressures. LOW CROSS-TALK through use of patented "isolated connector" arrangement. HIGH POWER RATING. All coils encapsuled in epoxy resin for quieter operation and resistance to moisture.

★ UNCONDITIONAL GUARANTEE for one year. (We will repair if faulty within 1 year.)

★ See one of our 700 dealers and distributors in U. S. and Canada for catalog sheets or write:

★ All Relays in weatherproof boxes for exterior installation.

★ Ganged, multiple position switch arrangement available for remote control selection of antennas.

STANDARD RELAYS: DK60, DK60-G, DK60-2C and DK60-G2C —

PRICED FROM $12.45

DOW-KEY COMPANY

Thief River Falls, Minnesota

For further information, check number 33, on page 110

Reciprocal Licensing Bill S. 2361 needs your support. Write your representative today!

G.d.o. & Z-Bridge [*from page 88*]

EXERCISE #16: Connect the g.d.o. as a field strength meter. Use with a phone transmitter to check modulation linearity. When a sine wave or other symmetrical waveform is put into the speech input, the reading of the g.d.o. will not change with modulation. The meter, moving, indicates nonlinearity or overmodulation. (Customarily, if a high quality mike is used, the electrical waveform of the male voice is somewhat non-symmetrical and may cause a bit of meter jumping. If this indicates peak-clipping, reversing the audio phase somewhere in the transmitter will usually help. If peak-clipping still occurs, turn down the transmitter audio gain.)

Going Further

This is just a sampling of what may be done with the combination of the g.d.o., the impedance bridge, and the control box. Many other uses are outlined in the excellent instruction books of the Knight-Kit equipment. Truly, the possibilities are limited only by the imagination of the amateur, for the one true characteristic of the amateur is a "curiosity beyond the instructions." For this, if no other reason, there is one vacant position (OFF) on the control box to act as a challenge. Perhaps the amateur wants an ohmmeter—perhaps a device that I can't now imagine. Remember that at least one editor wants to know *your* answer.

Credits

Much credit should be given the author's employer for both photographs and continuing encouragement. The progressive education of *all* is a matter of concern to General Electric. ■

Space Age Amateur [*from page 41*]

Obviously Peter is not one to sit still and "let the other fellow do it." Peter was one of the first pioneers of s.s.b. in Southern Rhodesia and has since helped many hams to go sideband, as well as other modes. He is a very generous person with his time and know-how and posses a high degree of ingenuity. Peter is highly thought of by the hams in Southern

Rhodesia and whenever a problem arises he can usually come up with the right answer.

We may not all be able to command a satellite but we can improve our knowledge of space communications and technology by following the example of people such as ZE5JJ. One way in which you can help is by supporting the OSCAR Program with tracking reports and even technical or financial assistance. If you would care to participate, write to the Project OSCAR Association, Box 183, Sunnyvale, California. ■

Combo Supply [*from page 35*]

age transformer is a heater-type time delay relay. For the 45 seconds it takes to close this circuit only the heater voltage is applied to the transmitter. This is a refinement not absolutely necessary and an alternate circuit is shown.

The several voltages are fed to the transmitter chassis through a homemade eight wire cable using octal plugs and sockets as connectors. Special precautions were taken to insulate the high voltage conductor in the cable as there is at times, more than a thousand volts between some conductors. Ordinary hookup wire or multiwire cable is not suitable for so high a potential. A good grade of well insulated wire was used for all the conductors and the 750 volt lead was further insulated by inserting it in a plastic tubing which increased the breakdown rating by 300%.

The ¼ amp fuse in the high voltage lead is there in hopes of preventing damage to the silicon rectifiers should something break down in the cable, connectors, or the final amplifier. Silicons are not quite as broadminded about temporary overloads as vacuum or gas-type tubes.

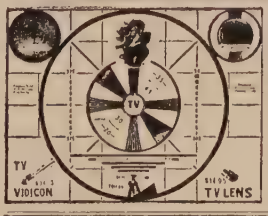
Series Regulator

The only single tube in the receiving category that will handle the current and plate dissipation in this series regulating application is the 6AS7G. It will pass up to 250 ma and is rated at 13 watts per triode section. Slightly more rugged and a bit higher in price is the 6080 in the industrial class. Of course the acme of tubes used in this service is the RCA 6336A, capable of passing 400 ma, but this is sheer extravagance at a price of $20.00. In this supply the maximum current that may be passed by the 6AS7G at 200 volts output is about 170 ma, provided the filter choke is so rated. If the required regulated voltage is higher, with less *IR*-drop across the tube, then the current drawn through the tube may be higher. For your own application the power dissipated in the tube is equal to the voltage from plate to cathode multiplied by the current drawn at the output; this product must not exceed the combined 26 watt rating of the two halves of the tube.

The swinging choke in the high voltage

Ready Right Now!
the fabulous HAMMARLUND
HX-50
COME SEE... COME BUY...
THE NEWEST AND THE BEST
ONLY $399.50 Amateur Net
ELECTRONIC CENTER, INC.
107 3rd Avenue, North
Minneapolis 1, Minn.
For further information, check number 34, on page 110

FREE!
FROM BILL BRURING W9ZSO
64 PAGE AMATEUR CATALOG
NEWEST NAME BRAND GEAR
Communication Equipment Co.
518 STATE ST.
LA CROSSE, WISC.
PHONE 4-7373



TV-CAMERA BUILT AT LOW COST
DETAILS 50¢
DENSON ELECTRONICS CORP.
Box 85, Rockville, Conn.

LOOKING FOR A TOWER?
Write today for the all-new TRISTAO catalog. A completely new concept in tower design for all amateur applications. TRISTAO—an old name in tower design with a new style and a brand new line.
TRISTAO Towers, Inc.
242 South J St., Dept. CQ10, Tulare, California

the fabulous
HAMMARLUND
HX-50

COME SEE...
COME BUY...
THE NEWEST
AND THE BEST

ONLY
$399.50
Amateur Net

ELECTRONIC SPECIALTIES
Div. Seattle Radio Supply, Inc.
2121 2nd Avenue
Seattle 1, Washington
For further information, check number 35, on page 110

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way—with an Instructograph Code Teacher. Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.

ENDORSED BY THOUSANDS!

The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the Instructograph System. Write today for full particulars and convenient rental plans

INSTRUCTOGRAPH COMPANY
4711 SHERIDAN RD., CHICAGO 40, ILL.
4700 Crenshaw Blvd., Los Angeles 43, Calif

ALL BAND TRAP ANTENNA!

Reduces Interference and Noise on All Makes Short Wave Receivers. Makes World Wide Reception Stronger, Clearer on All Bands!

For ALL Amateur Transmitters. Guaranteed for 500 Watts Power for PI-Net or Link Direct Feed. Light, Neat, Weatherproof

Complete as shown total length 102 ft. with 87 ft. of 72 ohm balanced feedline, Hi-impact molded resonant traps. (Wt. 8 oz. 1" x 1" long.) You *just tune* to *desired band* for beamlike results. Excellent for ALL world-wide short-wave receivers and amateur transmitters. For NOVICE AND ALL CLASS AMATEURS! NO EXTRA TUNERS OR GADGETS NEEDED! Eliminates 5 separate antennas with excellent performance guaranteed. Use as inverted V for all band power gain. NO HAYWIRE HOUSE APPEARANCE! EASY INSTALLATION!
80-40-20-15-10 meter bands. Complete $14.95
40-20-15-10 meter bands. 54-ft. ant. (best for w-w swl's.... 13.95
20-15-10 meter bands Dual Trap 24-ft. antenna 19.95
SEND ONLY $3.00 (cash, ck., mo) and pay postman balance COD plus postage on arrival or send full price for postpaid delivery
Free information available only from
WESTERN RADIO • Dept. AC-10 • Kearney, Nebraska

filter should have fairly high inductance at its minimum current rating to prevent the capacitor from charging up to the peak transformer voltage. Some applicable units are given in the parts list. The choke in the medium voltage filter circuit is not critical due to the steady load present and can even be scrounged from an old TV chassis. It may strike the reader that there are a few too many electrolytic and large value paper capacitors in the regulating section, but all of them serve a purpose in reducing ripple and transient load effects. Ripple is exceedingly low; in the order of 0.002% at a load of 100 ma.

Conclusion

The work involved in this project *has* paid off. Although the increase of input power has not brought any startling changes in signal reports, additional output power is available for future use.

The high voltage rests at 750 under idling conditions and drops to 700 under full carrier load. The regulated line is set at 195 volts to meet the screen rating of the 6146 in Class AB-1 and it shows no sign of flickering at any time. *And* my vox circuit is stable. ■

DX [*from page 55*]

Hot Ones

On July 31st, Britain and Malaya agreed to create (by August, 1963) The Federation of Malaysia, which will combine 9M2-Malaya, VS1 Singapore, VS4 Sarawak, VS5 Brunei, ZC5 North Borneo into one Federation. All I can say is that we better work them before they get on the deleted list. (*Tnx* Fla. DX Report)

QTH's

The QSL manager for VP5AH was listed erroneously as K4UFF. VP5AH's QSL Manager is K4UFE, Bob Williams, #151 Wallace Road, Memphis 17, Tenn.

AP5B via W4TO.
FB8CA via K2OJD.
FG7XT Box 185, Pointe-a-Pitre, Guadeloupe.
FP8CB via WA2WBH.
FY7YI s.s.b. via W4-JQM, others via W3-AYD.
HI8CLU via K4BMS.
HI8XAG via K4BMS.
HL9KN via W3MVK.
JZ0ML via W2CTN.
W4LCY/KM6 via W4-LCY.
MP4QBB via K4TJL.
PJ5CG and **PJ5CG/B** via KØGEN.
PJ5CH and **PJ5CH/B** via KØGZO.
PY4ART/7 via PY4TK.
SU1IM Ibrahim, 7 Roda Street, Cairo, Egypt.
TA4RZ via K4WIS.
UA9BZ Igor G. Davydav, Schadrinskya 80, Chelyabinsk 42, USSR.
UAØLA Adolph Dombrowsky, POB 29, Vladivostok, USSR.
ex VK9RO via VK5RG.
VP2AP via W5NOP.
VP5XG via G8VG.
VP7BP via W2CTN.
VQ9AC via WA2WFW.
VR5AA via W9ADN.
YN1TAT via KØRDP.
ex ZC6UNJ P. M. Altorf, 4 de Moucheronstraat, The Hague, Netherlands.
ex ZDRN David Davies, 27 Peak Road, Clanfield, Hants, England.
ZE1JE via W6YMV.
ZK1PK via W2CTN.
5U7AD Jo. Niamey Airport, Niger Republic.
9U5BB Box 14, Usumbura, Burundi.
9U5BH Box 81, Astride, Ruanda.
9U5CB Box 1122, Usumbura, Burundi.
9U5DM Box 1, Usumbura, Burundi.
9U5DS Box 1186, Usumbura, Burundi.
9U5JH via W4YWX.
9U5PC Box 18, Ruhengeri, Rivanda.
9U5XX Box 490, Usumbura, Burundi.

73, Urb, W2DEC

Ready Right Now!

the fabulous HAMMARLUND

HX-50

COME SEE...
COME BUY...

THE NEWEST AND THE BEST

ONLY $399.50 Amateur Net

LAFAYETTE RADIO

FOUR CONVENIENT LAFAYETTE RADIO LOCATIONS

"America's Headquarters for Ham Equipment"

- 111 Jericho Turnpike
  Syosset, L.I., N.Y.
- 165-08 Liberty Avenue
  Jamaica 33, N.Y.
- 182 Route 17
  Paramus, New Jersey
- 110 Federal Street
  Boston 10, Mass.

For further information, check number 86, on page 110

Next month . . .

. . . the 1962 CQ November Annual

This year's special edition promises to be the best ever published. Here's a sneak preview:

- A special section devoted entirely to surplus conversions and applications.
- A special section exclusively for antennas, design construction and theory.

Plus all CQ's regular technical and general interest articles, all CQ's monthly columns, and our Annual Distributor Index.

— AND —

Beginning in November *The VHF Amateur* "devoted entirely to the v.h.f. enthusiast" will be bound right into every copy of CQ. Here is just a sample of what you'll find in next month's edition:

- "The SB-62"—6 and 2 Meter S.S.B. Rig . . . . *by K9EID*
- DX Report column . . . . *conducted by K2ZSQ*
- U.H.F. column—activities reports and construction projects for the world above 220mc
- VHF S.S.B. column . . . . *conducted by K9EID*

Yes all this and much more in next month's CQ. It promises to be a sell out; reserve your copy today.

Propagation [*from page 60*]

Propagation Charts

This month's special Charts are based upon the following *effective radiated powers* at antenna radiation angles less than 15 degrees:

600 watts double-sideband a.m.
300 watts single-sideband a.m.
150 watts c.w.

Effective radiated power, or e.r.p., is equivalent to the transmitter's *power output* multiplied by the *power gain* of the antenna at radiation angles less than 15 degrees, as compared to a free space dipole reference antenna. For example, a double-sideband a.m. transmitter with a power output of 150 watts, feeding an antenna with a 6 db gain (a power gain of 4 times) over a free space dipole antenna at low radiation angles, has an e.r.p. of 150 × 4, or *600 watts*. This happens to be the e.r.p. for which the Propagation Charts have been computed, and no further correction is necessary in using the Charts. To use the Charts for other values of e.r.p., raise the quality figures shown in the "Last Minute Forecast" at the beginning of this column by one letter for each *increase* of 10 db in e.r.p., and *lower* the figures by one letter for each 10 db *decrease* in e.r.p. For example, a c.w. effective radiated power of 1,500 watts would raise a circuit quality rating from C (fair opening) to B (good opening), etc.

Work Plans

The DX Propagation Charts show the times that each amateur band (10 through 160 meters), is expected to open to various areas of the world. The information contained in the Charts can be reorganized into specific work-plans which can serve as useful guides during the Contest. For example, the following work-plan can be used for single-band 20 meter operation from the Western USA:

Sample 20 Meter Work-Plan for Western USA QTH

Time PST	Areas To Which Openings Are Optimum
00-03	Nothing optimum (good time for sleep).
03-06	" "
06-09	Europe, North & Central Africa, Eastern Mediterranean, Central & Southeast Asia, Pacific Island, New Zealand and Australia, South America, Antarctica.
09-12	" " " "
12-15	South Africa, South America (good time for a nap).
15-18	South Africa, South America, Pacific Islands and New Zealand.
18-21	South Africa, Central & Southeast Asia, Far East, Pacific Islands & New Zealand, South America, Antarctica.
21-00	Europe, Pacific Island, New Zealand and Australia, South America, Antarctica.

The above type of work-plan shows the best times for piling up points on 20 meters. Perhaps more important, it points out the best time for catching some sleep. Similar type work-plans can be devised for other QTH's.

The following is a sample of a typical *multi-band* work-plan. It has been devised from the Propagation Charts for an Eastern USA QTH.

Sample Multi-Band Work-Plan for Eastern USA QTH

Time EST	*Best Band*	*Areas Open*
00-03	40	Europe, Pacific Islands, New Zealand and Australia, South America, Antarctica
03-06	40	Above, plus Central and Southeast Asia and Far East
06-09	20	Central and Southeast Asia, Far East, Pacific Islands, New Zealand and Australia, South America, Antarctica
09-12	15	Europe, Africa, Eastern Meditteranean, Australia, South America, Antarctica
12-15	15	" " "
15-18	20	Europe, Africa, South America
18-21	15	Central & Southeast Asia, Far East, Pacific Islands, New Zealand and Australia, South America
21-00	40	Europe, Africa, South America

Similar type work-plans can be devised for other operating conditions.

Radio Storm

If a radio storm should develop during the Contest, circuits passing through or near the auroral zones will probably become weak, fade considerably, or may even blackout entirely, depending on the severity of the storm. On the other hand, often during such storms, conditions on north-south paths improve. If a radio storm should develop, concentrate on working east-west paths during the daylight hours, and north-south paths during the morning and evening hours. A "Last Minute Forecast" for the Phone section of the Contest, made at press time, appears at the beginning of this column. A similar forecast for the c.w. section will appear in next month's column.

Up-to-the-minute propagation forecasts during the Contest can be obtained from WWV broadcasts on 2.5, 5, 10, 15, 20 and 25 mc, at 19½ and 49½ minutes past each hour. WWV forecasts are intended primarily for north-Atlantic circuits, with a similar forecast for north-Pacific circuits available from WWVH, Hawaii on 5, 10 and 15 mc at 9 and 39 minutes past each hour.

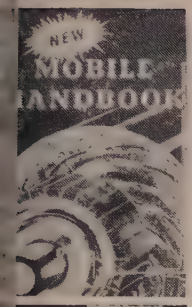
The WWV and WWVH forecasts consist of a letter-number combination transmitted in slow Morse Code. The letter "N" indicates that conditions at the time of broadcast are normal; the letter "U" that conditions are presently unsettled or erratic, and the letter "W" that conditions are disturbed and a radio storm is in progress. The number indicates the average quality of propagation conditions forecast for the next few hours, as follows: 1—useless, 2—very poor, 3—poor, 4—poor to fair, 5—fair, 6—fair to good, 7—good, 8—very good, 9—excellent.

Post Mortem

The *CQ* World Wide DX Contest, because of the large amount of amateur activity it generates throughout the world, offers an excellent opportunity to check the accuracy of the propagation prediction methods used in this column.

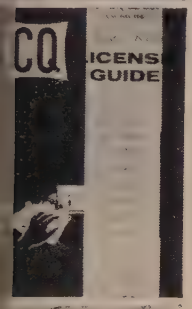
[*Continued on page 96*]

THE CQ HAM MART



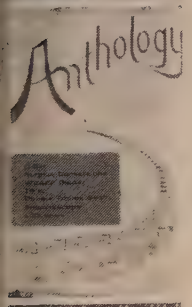
MOBILE HANDBOOK

Anyone who tries to go mobile without getting this book, should think twice before going ahead *Bill Orr, W6ASI* has put everything you need to know in this book, Build-its by the dozen . . . solutions to ignition problems, keeping the battery charged, noise . . . only *$2.95* postpaid.



CQ LICENSE GUIDE

212 pages of everything the Amateur must have to get his license and progress toward the general class ticket. Plus many additional pages of vital information for the ham operator. All this for only *$2.50.*



CQ ANTHOLOGY

Most amateurs do not have a good file of back issues of *CQ*. So we've looked back through the years *1945-52* and assembled all in one place the articles that have made a lasting stir. The issues containing most of these articles have long ago been sold out. The price is a mere *$2.00.*

THE NEW RTTY HANDBOOK

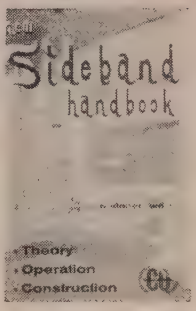
A treasury of vital and "hard to get" information. Loaded with equipment schematics, adjustment procedures, operating procedures, etc. A valuable asset to both the beginning and the experienced RTTY'er. Special section on getting started, all written by *Byron Kretzman, W2JTP*, a well known authority in the field. This book is a must for your library! Only *$3.95.*

VHF FOR THE RADIO AMATEUR

You can't afford to be without this dynamic new handbook designed with the VHF amateur in mind. Filled from cover to cover with all new and original construction material presented so that you can understand it. Written by *Frank C. Jones W6APF*, nationally acclaimed for his VHF pioneering. Available now for only *$3.50.*

COMMAND SETS

This is a collection of reprints, containing all of the available information on the conversion of the popular "Command" transmitters and receivers into good ham transmitters and receivers. Invaluable for Novice, Technician, General, Advanced and Extra class operators 136 fabulous pages, only *$1.50* postpaid.



SIDEBAND HANDBOOK

Written by *Don Stoner W6TNS*, was almost one full year in the preparation of this terrific volume. This is not a technical book. It explains sideband showing you how to get along with it . . . how to keep your rig working right . . . how to know when it isn't . . . and lots of how to build-it stuff, gadgets, receiving adaptors, exciters, amplifiers. Price, only *$3.00.*

COWAN PUBLISHING CORP. CQ-K
Book Division
300 West 43rd Street
New York 36, N. Y.

LIGHTED GLOBE	$24.95	☐
UNLIGHTED GLOBE	19.95	☐
ATLAS	15.00	☐
COMMAND SETS	1.50	☐
CODE RECORD (not shown)	3.50	☐
REGULAR LOG SHEETS (100)	1.00	☐
SSB LOG SHEETS (100)	1.00	☐
HAM'S INTERPRETER	1.50	☐
TVI HANDBOOK	1.75	☐
BINDER—YEAR WANTED	4.00	☐
VHF FOR THE RADIO AMATEUR	3.50	☐
CQ ANTHOLOLOGY	2.00	☐
HI-FI BOOK	2.50	☐
SIDEBAND HANDBOOK	3.00	☐
CQ LICENSE GUIDE	2.50	☐
SURPLUS SCHEMATICS HANDBOOK	2.50	☐
DX ZONE MAP	3.00	☐
NEW RTTY HANDBOOK	3.95	☐
DIODE SOURCE BOOK	2.50	☐
USA-CA RECORD BOOK	1.25	☐
"NEW" MOBILE HANDBOOK	2.95	☐

SIRS: My check (money order) for $_____ is enclosed. Please send the following items to:

Name_____

Address_____

City_____ Zone_____ State_____

New York City Residents Add 3% Sales Tax

the fabulous
HAMMARLUND
HX-50

COME SEE...
COME BUY...

ONLY
$399.50
Amateur Net

THE NEWEST
AND THE BEST

EVANS RADIO
"Your Friendly Supplier"
PH: 603-225-3358
Route 3A Bow Junction
Concord, New Hampshire
For further information, check number 37, on page 110

CUT HOLES
FAST

GREENLEE CHASSIS PUNCHES

Make accurate, finished holes in 1½ minutes or less in metal, hard rubber and plastics. No tedious sawing or filing — a few turns of the wrench does the job. All standard sizes . . . round, square, key, or "D" shapes for sockets, switches, meters, etc. At your electronic parts dealer. Literature on request.

GREENLEE TOOL CO.
2028 Columbia Ave., Rockford, Illinois
For further information, check number 38, on page 110

VHF [*from page 63*]

near Boulder and the station is operated as WØFPP/Ø. Schedules will be gladly made for contest dates in the future. Operation currently is on 6 and 2 meters. Anyone who has contacted the station in the past or does so in the future and desires a QSL from Colorado, drop a QSL c/o Chief Engineer, Radio and TV Dept., University of Colorado, Boulder, Colo. So advises William C. Lewis, 428 Concord, Boulder, Colo.

Things are pretty quiet in California, with the exception of the Stanford to Southern California forward scatter tests. Many stations in this area have heard and worked the station in Palo Alto.

And that about caps our grid for another session. Keep the letters and photographs rolling in. See you in 30!

73, de Don, W6TNS

Sideband [*from page 67*]

Taking the system as a whole, imperfect sideband suppression manifests itself as inverted speech superimposed upon the wanted sideband and not as adjacent channel interference. It is claimed that the listener's ear can descriminate against this kind of poor suppression more readily than the interference caused by the more conventional types of s.s.b. transmitters. However, with highly selective receivers, this is a moot question. Selectivity at the receiving end is of no help to a poor third-method transmitter.

One really nice feature of this system is that a poorly adjusted third-method transmitter causes more trouble to its owner than to the occupants of adjacent channels! In this respect, we're all for it!

WAS Sideband Contest Suspended

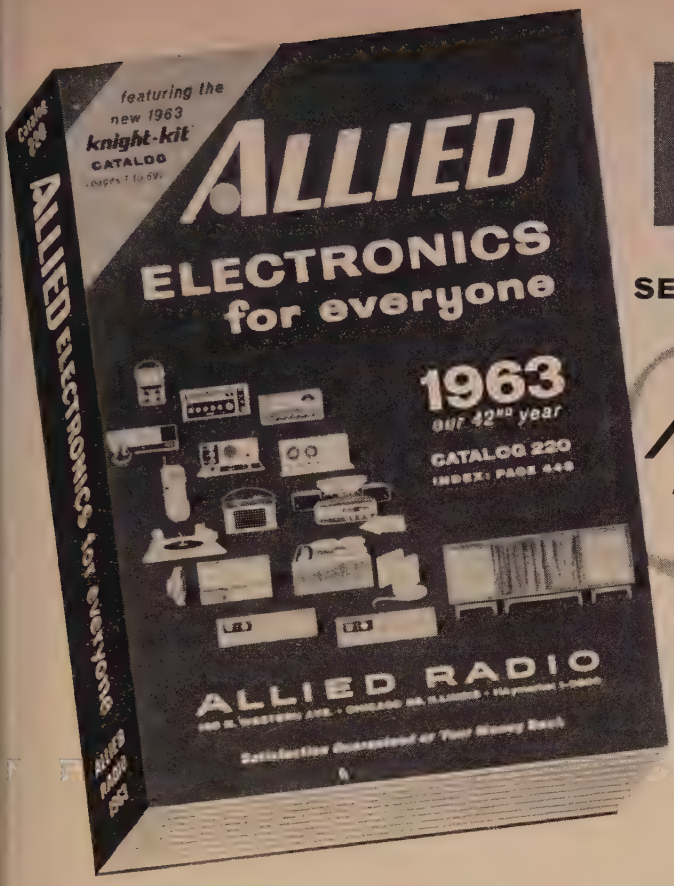
We hope you contest lovers won't be too disappointed but we have decided to suspend the WAS Sideband Contest. The reasons for our decision were two-fold: last year's return of logs was very disappointing to the point where it almost didn't pay to publish the scores; and secondly, most if not all of today's phone contests have become sideband contests and we felt the novelty was wearing off. You can overdo a good thing and if we wind up with too many sideband contests during the year, eventually no one will want to participate.

So we wish you all good luck in the other forthcoming phone-sideband Contests and hope you have lots of fun!

K2GXI Works 50 on 40!

Congratulations to Bob Sommerfelt, K2GXI, who became the first station in the world to earn the "Worked 50" *CQ* certificate for 7 mc operation only. Located in Buffalo, New York, Bob's station consists of a 100V exciter driving a 1kw grounded grid linear, a 75A4 receiver; and a 4-element tribander beam with a 2-element 40 meter beam stacked 13 feet above it, both homebrew. Among the fifty countries worked and confirmed by Bob on 7 mc are: St. Martin, Baja Nuevo, San Andres, Canton Island, Antarctica, Kure Island, Midway Island, Serrana Bank, Wake Island, Netherlands Antilles, Surinam, Grenada, St. Vincent, Brit. Guiana, Christmas Island, New Hebrides, Cook Island, South Africa, and Israel. Anyone else close to this record made by K2GXI?

73, Irv and Dorothy



FREE

SEND TODAY FOR YOUR

ALLIED 1963 CATALOG

464 PAGES
WORLD'S LARGEST
ELECTRONICS CATALOG

BIGGEST SELECTION
BIGGEST SAVINGS

Everything IN ELECTRONICS FOR THE AMATEUR

get every buying advantage

- Ham Receivers and Transmitters
- World's Largest Stocks of Station Supplies
- New Build-Your-Own Ham Knight-Kits®
- Citizens Band 2-Way Radio
- Electron Tubes and Semiconductors
- Test Instruments and Meters
- Everything in Stereo Hi-Fi
- Tape Recorders, Tape & Accessories
- Everything in Electronic Parts, Tools & Technical Books

FREE

SEND FOR YOUR COPY TODAY!

FOR THAT BEST DEAL on all the newest equipment you want, write or call Don Koby, W9VHI, c/o ALLIED, or stop in at our ham shack and meet Joe Huffman, W9BHD; Joe Gizzi, W9HLA; John Chass, K9LOK; Tasker Day, W9QBB. *In Milwaukee:* Lowell Warshawsky, W9NGV.

HAM-TO-HAM HELP—our staff of more than 50 Hams goes all-out to give you the help you want. Whether you write, call or visit us in person, you'll like the friendly attention and interest you get *all-ways* at ALLIED.

NO MONEY DOWN: Now! More Buying Power with Your Allied Credit Fund Plan

ALLIED RADIO
serving the Amateur for 42 years

ALLIED RADIO, Dept. 41-22-K
100 N. Western Ave., Chicago 80, Ill.

☐ Send FREE 1963 ALLIED Catalog

Name_____
PLEASE PRINT

Address_____

City_____ Zone____ State_____

For further information, check number 39 on page 110

the fabulous
HAMMARLUND
HX-50

COME SEE...
COME BUY...
THE NEWEST
AND THE BEST

ONLY
$399.50
Amateur Net

PRIEST ELECTRONICS, INC.

6431 Tidewater Drive

Norfolk 9, Va.

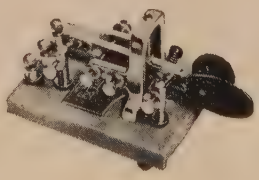
For further information, check number 42, on page 110

MAKES SENDING A PLEASURE
With VIBROPLEX

No special skill required. Just press the lever — Vibroplex DOES THE REST. All parts precision machined and key is adjustable to any speed. Will not tire the arm. Five models, priced at $17.95 to $33.95.

VIBRO-KEYER

In building electronic transmitting units, Vibro-Keyer supplies the perfect part. With a finely polished base 3½" by 4½" and a weight of 2¾ lbs. Has same contacts and finely finished Vibroplex parts. Standard, at $17.95. DeLuxe, with Chrome Plated Base, priced at $22.45.



Order today at your dealers or direct.

THE VIBROPLEX CO., INC.
833 Broadway New York 3, N. Y.

FREE Folder

TELEVISION ENGINEER

Need good right hand man. Must be experienced and competent in troubleshooting RCA Studio, Transmitter and Microwave Equipment. Need someone to keep TV station on air while I chase DX. Good opportunity for right man.

JERRY E. SMITH, W5TFV
KRIS-TV BOX 840 CORPUS CHRISTI, TEXAS

Ham Clinic [*from page 65*]

to handle these requests and a special system to insure very prompt service in getting the information back to the writer of the request. This is the procedure to be followed by anyone wishing to receive a manual:

Send your request to: National Radio Company, Inc., 37 Washington St., Melrose 76, Mass. Att: Mr. Harvey Whitmore, Service Manager. Specify equipment for which manual is wanted. Upon receipt of manual, return a check or money order to National Radio in the postage paid envelope you will find enclosed with the manual. If the manual requested is no longer in stock, you will receive a copy of the schematic and a parts list at no charge. You can't beat that system, can you?

HW-10 and HW-20 Alignment—Those of you who may experience a little difficulty in aligning the v.f.o. on either the HW-10 or HW-20 should remember that both have a tunable i.f. from 22 to 24 mc, and on both the 6 and 2 meter rigs, when alignment is begun, it is easy to pick up the third harmonic by mistake and consider it the operating frequency. Once a builder has fallen into this trap it is an endless chain. The v.f.o. coil on both sets should be set 13/16" out from the housing and after alignment, it will be found that this adjustment will be very close to that 13/16 of an inch. The usual problem of not being able to hear the 6 or 2 meter energy is because of the fact that the tripler and doubler stages are so far out of alignment that the signal is not passing or multiplying up to that frequency with enough amplitude to be heard by the receiver.

HAM CLINIC thanks W. J. (Rex) Remer (K8-GND), Technical Consultant at the Heath Company for assisting us to answer the questions on Heath equipment.

NC-155 and NC-190 Hum Modulation—Certain NC-155s and NC-190s exhibit hum modulation on c.w. and s.s.b. This problem has been determined to be faulty tubes in the first and second conversion oscillator V_2 & V_3, 6BE6. Replacement of the tube with *another* brand whose cathode construction is different will cure this problem. Changing the 6BE6 tubes is not recommended if there is no hum, because very few sets exhibit the characteristic.

Thirty

The DX (what there is left of it) season is just around the corner. I suggest that everyone take a good look at the lower frequencies, including 160 meters. Here is where you are going to communicate. With the diminishing sun-spot cycle h.f. communication will gradually get worse.

Do let us hear from you. 73, 75 and 72, Chuck

Novice [*from page 71*]

Can you take a 150 watt transmitter, such as say, the Knight Kit, T-150 and cut the power input to 75 watts for Novice use? I hope that you can help me with this problem.

"*CQ* stands first in ham news with me. Keep up the good work, Walt. 73. Bob Van Winkle."

Some of the more popular 150 watt class rigs use *parallel* tubes in the final and of course one of these could be removed thereby halving the power input.

A simple way to cut the power to some extent is to load the final lightly; just don't load it to the limit. Another way is to lower the screen-grid voltage while keeping the plate voltage the same.

Jerry Brunner, WA6BYR, 1850 Broadmoor Avenue, West Covina, California writes; "Dear Walt: You and

I share feelings about the Novice license and its purpose for existence. As a high school teacher (electricity, electronics, radio and TV) I have the pleasure of sponsoring the school radio club. So far there have been no members who have gotten a license without getting the Novice first; and if I have anything to say about it there never will be.

"This, however, is not the reason for writing. In your column (July *CQ*) you told how to determine the voltages and current of an unmarked power transformer. Permit me to pass on the method we use in the shops and have found very successful.

1. Pair-up all wires. An ohmmeter or any other continuity checker does this well.

2. Connect a 120 v.a.c. light bulb (any wattage will do) in series with the line delivering power to the "suspected" primary. If this line is to the high voltage secondary, the bulb will not light. If one of the low voltage secondaries is connected first, the light will be near normal brilliance. The true primary will give a dull orange glow in the bulb. If no two transformer leads are shorted this is a real quick and safe check. No blown fuses or burned out transformers.

3. With the a.c. line connected directly to the primary and the bulb now removed from the circuit, voltage checks can be made.

"There are two methods that we use to get current ratings of "Junkbox" transformers. One is only an educated guess but the other is quite accurate and so far we have had no problems with them.

"The guess consists of determining the cross-sectional area of the core of the transformer. A rule-of-thumb for core area is 50 watts per square inch. A little Ohm's Law gives the current, although not for each set of secondaries.

"The more accurate method is to apply an adjustable load to the output voltage. While measuring the voltage adjust the load until there is a 15% drop in the output voltage. An ammeter placed in the circuit at this point or a resistance measurement and Ohm's Law will quickly determine the current rating.

"To my knowledge these methods have not been applied to a known transformer for an accuracy check but I do know that we have no burned out transformers and I feel this is as good a recommendation as is needed when dealing with salvaged materials.

"Keep up the good work on the NOVICE COLUMN, Walt. My students and I fairly wear out *CQ* because of it. 73, Jerry, WA6BYR."

Help Wanted

If you have an idea that some one could help you get your license and possibly get your station going, drop me a line giving all particulars, name, address, telephone number, your needs and possibly your age, and I will put them in this section of NOVICE and we hope someone will offer to help you. These future hams now desire a little of your time and efforts:

Jerry Greathouse, 718 East Pine, Enid, Oklahoma.

Bob Clark, Jr., 1617 Woodland Street S.E., Decatur, Alabama. Phone: EL 3-5508.

John Gedcus, Jr., (18) R.R. #4, Box 255, Rochester, Indiana.

Curtis Lomas, (15) 5845 Mendocino Avenue, Oakland, California. Phone: OL 8-4828.

Pete Dague, 418 Bank Street, Lodi, Ohio needs help with code and theory.

Robert G. Vansteenburgh, R.R., Chase, Kansas. Bob is a 30 year old cerebral palsy victim. He has an NC-100 and a good antenna and the will to learn ham radio. He needs some ham pen-pals.

Barney (B.J.) Scharbach, Essexville, Michigan would have been a Novice in the galena, cat-whisker, spark-coil and Mother's oats box days but like a lot of us just never "doed" it. He's ready now, Help please. He even ordered the "Rules" as per NOVICE.

Well that's just about it for this month. I have some good letters that will help the next few issues but don't let that keep you from writing. I have now received letters from 15 countries and I might say I am pleased with the way people read *CQ* and NOVICE. I will try to do better. This has been the hardest column that W8ZCV ever wrote for any magazine. My Dad's funeral is tomorrow. 73 es CUL, Walt

K6CT

BEAM

performance proved . . . around the world

From California to the British Isles . . . from Australia to South Africa — the superior performance of Space-Raider *polarized diversity beams* is acclaimed by hams in every area of the globe.

W6BHM — "During many contacts, both VK6QL and VK3VL reported my signals to be the only readable U.S. signal on the band."

W5YPH — "With our new Space-Raider antenna we now have regular contacts with our 100-watt missionary station in Urandi, Africa . . . 8,000 miles away."

W6HG — "HC4RC in Ecuador reported that my signal was S9 on an otherwise dead band. My power input: 48 *watts* — never more!"

A K6CT *polarized diversity beam** could well be the solution to *your* antenna problems.

Priced from $44.50

Available direct, or from your distributor.

* Patent pending.

Space-Raider

ANTENNAS

1076 E. Walnut St., Pasadena, Calif.

TELEPHONE: SYcamore 2-2526

For further information, check number 41, on page 110

FREE Catalog

OF THE WORLD'S FINEST ELECTRONIC GOV'T SURPLUS BARGAINS

HUNDREDS OF TOP QUALITY ITEMS — Receivers, Transmitters, Microphones, Inverters, Power Supplies, Meters, Phones, Antennas, Indicators, Filters, Transformers, Amplifiers, Headsets, Converters, Control Boxes, Dynamotors, Test Equipment, Motors, Blowers, Cable, Keyers, Chokes, Handsets, Switches, etc., etc. Send for FREE CATALOG—Dept. CQ.

FAIR RADIO SALES

2133 ELIDA RD. • Box 1105 • LIMA, OHIO

the fabulous
HAMMARLUND
HX-50

COME SEE...
COME BUY...
THE NEWEST
AND THE BEST

ONLY
$399.50
Amateur Net

R & R ELECTRONIC SUPPLY CO.

1441 Butternut St.

Abilene, Texas

For further information, check number 42, on page 110

Tops in its class, the *new* Gonset GC-105 Communicator is a complete, self-contained 2 meter station with transmitter, receiver and built-in power supply. Completely compatible with Gonset new model 3357 VFO or 6 crystal positions available.

For further information on Gonset quality products see your nearest Gonset distributor or write to: Dept. CQ-10

GONSET®
DIVISION OF YOUNG SPRING & WIRE CORPORATION
801 SOUTH MAIN STREET, BURBANK, CALIFORNIA

For further information, check number 43, on page 110

USA-CA [*from page 78*]

Do not underestimate the collective mass opinion capable of being generated by amateur radio clubs functioning at grass-roots level. Just like pennies make dollars, club level PR can build up a tremendous public understanding of hamdom's potential role in the public interest.

As we have repeatedly stated, there is no more potent PR vehicle at club level to exploit for favorable publicity than an awards program attuned to promoting some significant factor of our society within the domain of the Public Interest.

United States Awards Public Relations

Amateur radio awards programs in the United States publicize various public interests in the following publicity areas (Listings from Directory of Certificates and Awards):

State	Award Level				
	National	Area	State	County	City
Alabama†	....	....	....	....	....
Alaska	....	....	2	....	2
Arizona	....	....	2	....	1
Arkansas*	....	....	....	....	1
California	5	1	3	5	13
Colorado†	1	....	1	....	3
Connecticut	1	....	1	....	....
Delaware	....	....	1	....	....
Florida	2	....	5	1	9
Georgia	....	....	2	..	3
Hawaii*	....	....	3	3	1
Idaho*	....	....	....	....	....
Illinois	....	....	2	....	7
Indiana*	....	....	1	1	2
Iowa†	....	....	....	....	....
Kansas	....	1	5	1	9
Kentucky	....	....	3	....	1
Louisiana	....	..	1	....	2
Maine	....	1	2	....	3
Maryland	....	..	3	....	4
Massachusetts	....	....	1	2	6
Michigan	....	1	1	....	3
Minnesota	....	....	1	....	1
Mississippi	....	....	1	....	....
Missouri	....	3	1	....	2
Montana	....	.	2	....	2
Nebraska	....	..	2	....	1
Nevada*	....	....	1	...	...
New Hampshire	....	1	1		...
New Jersey	....	...	4	1	..
New Mexico	..	1	1	.	3
New York	3	2	2	1	8
North Carolina*	....	1			2
North Dakota*	....	.			
Ohio	....	5	10	2	26
Oklahoma*					4
Oregon*	1	....			2
Pennsylvania	2	5	3	1	15
Rhode Island	.	..	2	1	1
South Carolina	....	...	1	...	..
South Dakota†	...	..	..	....	.
Tennessee†	....	....	...	...	2
Texas	3	2	2	3	9
Utah*	....	.		....	....
Vermont	....	....	1	1	....
Virginia	....	1	2	....	....
Washington	1	1	....	....	5
West Virginia	...	...	2	....	...
Wisconsin	...	....	....	....	....
Wyoming*	....	....	....	....	....
Totals	19	26	78	21	153

†County award pending.

*No known projected counties awards program.

The above shows extent clubs in various states are PR conscious, and use of the awards PR vehicle to acquaint the general public with amateur operations.

USA-CA Awards Support Policy

The USA-CA Program includes all U.S. awards within scope of its support coverage. USA-CA is unique in that it does not compete with other awards programs. To the contrary, USA-CA seeks to help all clubs and organizations realize maximum possible publicity for both their own and hamdom's interests which includes the public interest. Clubs and organizations may feel free to solicit this column for all reasonable assistance.

What's Cooking Department

The 'What's Cooking Department' is loaded with goodies. Four or five states are in process of dreaming up new county awards. Several awards presentations at state governor level are in process as we write this. Many county field trips are in plans. The Flying Hams are conjuring up some exciting events. Too bad you swabs seem to prefer (by past polls) rag emphasis on Do-it-your-self-articles.

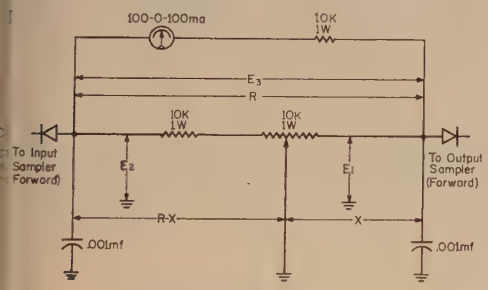
Let's face a fact. A magazine like CQ or QST, has to operate on normal 60-day deadline so in most cases news is just plain old stale stuff by time it hits the news stands . . . but, it need not be . . . as we have proven in this column, one can be alert to what is being planned and projected for future, and news of such holds high interest.

While the USA-CA column brings you much of what has happened in the news, it also attempts to alert you to "What's Cooking" You just keep creating the news and sending in high-interest goodies and pics, and we'll yet turn this technical *CQ* rag into a news *and* do-it-yourself publication.

73, Clif, K6BX

Linearity Detector [*from page 24*]

Practical Application



From the theoretical analysis it may be seen that, when $E_1 = E_2$, $E_3 = 0$ and

$$Db = 20 \log \left(\frac{R - X}{X} \right)$$

the following chart may be derived as was given in abbreviated form in Table I.

Db Gain	*R–X Ohms*	*Y Ohms*	$\frac{R-X}{X}$	$Log\left(\frac{R-X}{X}\right)$
0	10,000	10,000	1.0000	0.0000
2	11,146	8854	1.2588	0.1000
4	12,262	7738	1.5848	0.2000
6	13,323	6677	1.9952	0.3000
8	14,305	5695	2.5117	0.4000
10	15,195	4805	3.1621	0.5000
12	15,985	4015	3.9809	0.6000
14	16,674	3326	5.0122	0.7000
16	17,264	2736	6.3100	0.8000
18	17,764	2236	7.9433	0.9000
20	18,182	1818	10.0000	1.0000

Citizen Band Class "D" Crystals

CITIZEN BAND CLASS "D" CRYSTALS
3rd overtone — .005% tolerance — to meet all FCC requirements. Hermetically sealed HC6/U holders. ½" pin spacing. .050 pins. (Add 15c per crystal for .093 pins). **$2.95 EACH**

All 23 megacycle frequencies in stock: 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225, 27.255.

Matched crystal sets for ALL CB units (Specify equipment make and model numbers) ..... **$5.90 per set**

CRYSTALS IN HC6/U HOLDERS

SEALED OVERTONE — .486 pin spacing — .050 diameter — .005% tolerance
15 to 30 MC ..... **$3.85 ea.**
30 to 45 MC ..... **$4.10 ea.**
45 to 60 MC ..... **$4.50 ea.**

FUNDAMENTAL FREQ. SEALED — From 1400 KC to 2000 KC .005% tolerance ..... **$5.00 ea.**
From 2000 KC to 10,000 KC, any frequency, .005% tolerance ..... **$3.50 ea.**

RADIO CONTROL — Specify frequency. .05 pins spaced ½" (Add 15c for .093 pins). ..... **$2.95 ea.**

QUARTZ CRYSTALS FOR EVERY SERVICE

All crystals made from Grade "A" imported quartz—ground and etched to exact frequencies. Unconditionally guaranteed! Supplied in:

FT-243 holders — Pin spacing ½" Pin diameter .093
MC-7 holders — Pin spacing ¾" Pin diameter .125
CRIA/AR holders — Pin spacing ½" Pin diameter .125
FT-171 holders — Pin spacing ¾" Banana pins

MADE TO ORDER CRYSTALS . . . Specify holder wanted
1001 KC to 1600 KC: .005% tolerance ..... **$4.50 ea.**
1601 KC to 2500 KC: .005% tolerance ..... **$2.75 ea.**
2501 KC to 9000 KC: .005% tolerance ..... **$2.50 ea.**
9001 KC to 11,000 KC: .005% tolerance ..... **$3.00 ea.**

Amateur, Novice, Technician Band Crystals

.01% Tolerance . . . **$1.50 ea.** — 80 meters (3701-3749 KC) 40 meters (7152-7198 KC), 15 meters (7034-7082 KC), 6 meters (8335-8650 KC) within 1 KC
FT-241 Lattice Crystals in all frequencies from 370 KC to 540 KC (oll except 455 KC and 500 KC) ..... **50c ea.**
Pin spacing ½" Pin diameter .093
Matched pairs — 15 cycles **$2.50** per pair
200 KC Crystals, **$2.00 ea.**; 455 KC Crystals, **$1.25 ea.**; 500 KC Crystals, **$1.25 ea.**; 100 KC Frequency Standard Crystals in HC6/U holders **$4.50 ea.**; Socket for FT-243 Crystal **15c ea.**; Dual Socket for FT-243 Crystals, **15c ea.**; Sockets for MC-7 and FT-171 Crystals **25c ea.**; Ceramic Socket for HC6/U Crystals **20c ea.**

ENGINEERING SAMPLES and small quantities for prototypes now made at either Chicago or Fort Myers plants with 24 hour service. IN CHICAGO, PHONE GLadstone 3-3555

IF YOUR PARTS DEALER DOESN'T STOCK Texas Crystals, order direct and send us his name.

TERMS: All items subject to prior sale and change of price without notice. All crystal orders must be accompanied by check, money order or cash with payment in full.

RUSH YOUR ORDER NOW TO

TEXAS CRYSTALS

Dept. CQ-8 Div. of Whitehall Electronics Corp.
1000 Crystal Drive, Fort Myers, Florida Phone WE 6-2100

FOR SHIPMENT VIA FIRST CLASS MAIL AT NO EXTRA COST ATTACH THIS ADVT. TO YOUR ORDER!

For further information, check number 44, on page 110

Ready Right Now!

the fabulous HAMMARLUND

HX-50

COME SEE... COME BUY...

THE NEWEST AND THE BEST

ONLY $399.50 Amateur Net

RADIO PRODUCTS Rapsco SALES COMPANY

1237 SIXTEENTH ST. • DENVER 2, COLORADO • CHERRY 4-6591

For further information, check number 45, on page 110

GUARANTEED CRYSTALS!

ALL MARINE FREQ.-FT-243, DC-34 Holders. Tol. .005%...$2.50
POLICE, C.A.P., CD, MARS. Tol. .01%...$2.00
CITIZENS BAND—11 METERS—.005% Tol.
26.965 to 27.225 MC, 3rd Over. Herm. Seal or FT-243...$2.95
13.4825 to 13.6125 MC, 2nd Harm.Herm. Seal or FT-243...$2.95
6741.25 to 6806.25 Kc, 4th Harm. FT-243 only...$2.50

SPECIAL! STOCK CRYSTALS

FT-243 Holders 5700 KC to 8700 KC in steps of 25 KC's

$1.19 ea.

SEND FOR FREE CATALOG

DC-34 Holders 1690 KC to 4400 KC steps of 10 KC ea $1.19

NOVICE BAND FT-243 Fund. 1.49 ea.
80 Meter 3701-3748—Steps of 1 KC. FT-243
40 Meter 7150-7198—Steps of 1 KC. FT-243
Dbl. to 40 Meter 3576-3599. Steps of 1 KC. FT-243
15 Meter 5276-5312—7034-7083 Steps of 1 KC. FT-243

FT-243—2 Meters (Steps of 1 KC)...$1.49
FT-243—6 Meters (Steps of 1 KC)...$1.49
FT-243—From 3000-4000...$1.49
FT-243—From 1005-2999 (Steps of 5 KC)...$2.50
FT-241 SSB Low Freq. Xtals 370 to 540 KC (Steps of 1.852 and 1.388)...$ .69
FT-241 SSB Matched Pairs...$2.39

Include 5c per crystal for postage (U. S. Only) Calif. add 4% Tax. No C.O.D.'s. Prices subject to change. Ind. 2nd choice; substitution may be necessary. MIN. ORDER $2.50

"The House of Crystals"

U. S. CRYSTALS, Inc.

1342 S. La Brea Ave. Los Angeles 19, Calif.

For further information, check number 46, on page 110

RTTY [*from page 69*]

very good file on such requests, and you probably will get a pre-printed bulletin telling you exactly how to modify their equipment for RTTY operation. By writing directly to the manufacturer you not only get the dope "right from the horse's mouth," but you might get it faster than through us, especially if some research is required. (Don't embarrass them, though, by asking why they don't build f.s.k. into their transmitters in the first place!)

73, Byron, W2JTP

YL [*from page 80*]

23rd YLRL Anniversary Party

The operating contest of the year for YLs will be coming up soon—YLRL's 23rd Anniversary Party. Note the dates: CW—Oct. 24-25; Phone—Nov. 7-8. YLRL v.p. K2JYZ recommends that all YL nets close during the hours of the contest as net contacts don't count. She also issues a very special plea to all YLs to *please* get in the c.w. portion and give the YL c.w. ops a contact. Complete rules in separate box.

TYLRUN Party

The TYLRUN 8th annual birthday party will be sponsored by WHOOTs of Dallas. It will be held at the Lamplighter Motor Inn on Highway 80 East with the luncheon set for 12 noon on Nov. 3, cost $2.50. Accommodations are available at the Inn, and there will be a hospitality room. Reservations should be sent to Ginnie Salter, 10756 Wyatt Circle, Dallas, Tex.

Congrats . . .

To K6OQD, Jean, and Bill, K6OQC, on the arrival of their first jr. op, Kathryn Jean, on July 17. Jean has been YLRL treasurer for the last three years. . . . Congrats also to W1HOY, Helen, for being the first YL to earn USA-CA award (500 counties cfmd) on v.h.f. Her certificate was #88.

Correction

Re the results of the YLRL v.h.f. contest, see *CQ* for Aug. p. 116. V.P. K2JYZ informs us that 3rd high score should have been listed as follows: WA6KLP, Darlene Johnson, 68 points.

Club News

The Floridora Novice c.w. net meets at 0900 EST on 7.185. NCS WN4EEO invites all YLs to participate; a certificate will be awarded for ten consecutive check-ins. To apply for the Floridora certificate, send only the calls and names of Floridora YLs worked and have the list endorsed by two amateurs. W-K stations need 10 contacts; DX stations only 5. Send list and self-addressed stamped envelope to K4RNS, Marge.

33, W5RZJ

"— with a MATERIAL DIFFERENCE!"

"BEAMED-POWER" ANTENNAS and ANTENNA SYSTEMS

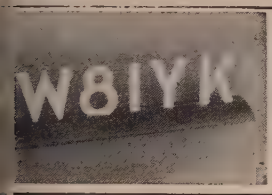
The Choice of the Discriminating Communication Engineer . . . the Man who Never Settles for Anything Less than THE-VERY-BEST!

You too — can enjoy World renowned Telrex performance and value!
Send for PL77 condensed data and pricing catalog, describes 107 popular amateur antennas from $6.95 to $999.00. Expanded data sheets — Your favorite band, also available.

ANTENNAS SINCE 1921 **Telrex LABORATORIES** Communication and TV Antennas

ASBURY PARK 25, NEW JERSEY, U.S.A.

For further information, check number 47, on page 110



CALL LETTER SIGNS

Order your call in neat 2-inch die cut letters with base. Just right for the shack. You assemble. Letters: 3/32" showcard stock. Base: Select quality wood.

Price $1.00 Postpaid

NEW PRODUCTS Dept. B
Box 481 Grand Haven, Mich.

TELETYPEWRITER EQUIPMENT • COLLINS 51J-3 and R-390A RECEIVERS Teletype: #14, 15, 19, 26, 28; Kleinschmidt: TT4A, TT76, TT98, etc. Telewriter Receiving Converter, etc. For general information & equipment list, write to TOM, W1AFN *ALLTRONICS-HOWARD CO.*, Box 19, Boston 1, Mass. RIchmond 2-0048.

TRIGGER

WE BUY

HAM EQUIPMENT

FOR

CASH

STORE HOURS
WEEKDAYS 1-9 PM
SATURDAY 9-6 PM

7361 W. NORTH AVE.
RIVER FOREST, ILL.
(suburban chicago)

PR 1-8616 TU 9-6429

(business phones with QTH extensions)
For further information, check number 48, on page 110

Ready Right Now!

the fabulous
HAMMARLUND
HX-50

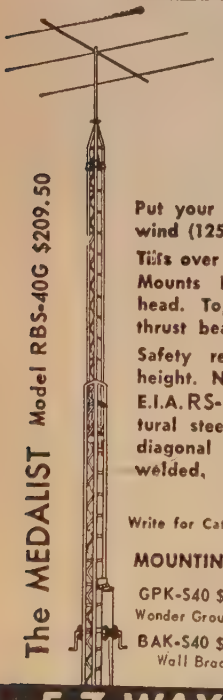
COME SEE...
COME BUY...

ONLY
$399.50
Amateur Net

THE NEWEST AND THE BEST

RSE HAM SHACK
Div. Radio Supply & Eng. Co., Inc.
90 Selden
Detroit 1, Michigan

For further information, check number 49, on page 110



The MEDALIST Model RBS-40G $209.50

STURDY
E-Z WAY TOWERS

Put your Tribander at 41' in 70 mph wind (125 mph cranked down to 24').
Tilts over for E-Z access to array.
Mounts Ham-M Rotor inside tower head. Top radial bushing • vertical thrust bearing.
Safety rest locks tower at desired height. No weight on cables.
E.I.A. RS-222 specs. Heavy wall structural steel tube legs, solid steel rod diagonal & horizontal bracing — arc welded.

Sold by Top Flight Distributors Everywhere!

Write for Catalog 22-1

MOUNTING KITS:
GPK-S40 $75.00
Wonder Ground Post
BAK-S40 $10.50
Wall Bracket

$169.50
MODEL RBS-40P.
Dip painted

E-Z WAY TOWERS, Inc.
P.O. BOX 5767 TAMPA 5, FLORIDA

For further information, check number 50, on page 110

Ham Shop

Rates for the HAM SHOP are 5¢ per word for advertising which, in our opinion is obviously of a non-commercial nature. A charge of 25¢ per word is made to all commercial advertisers or business organizations.

Your copy should be preferably typewritten, double spaced on one side of the page only.

We do not bill for advertising in the HAM SHOP Full remittance *must* accompany all orders.

Closing date is the 15th of the 2nd month preceding date of publication.

We reserve the right to reject advertising which we feel is not of an amateur radio nature.

Because the advertisers and equipment contained in the HAM SHOP have not been investigated, the publishers of *CQ* cannot vouch for the merchandise listed therein.

TUBES WANTED. All types. Highest prices paid. Write Lou-tronics, Inc., 131 Lawrence Street, Brooklyn 1, N.Y. Stamp for ham tube list.

SURPLUS "GREAT BUYS" ARR-27 Receiver 70 lbs. easy 432 modification $27.50, two—$50. APIX-2, 56 lbs. $17.50; two—$30. Dynamoter PE-94, 45 lbs. $1.50. Gyro APA57 16 lbs. $3.95 Experimenters Special. All items New. Lis 10¢. Fertik's Ninth Tioga, Phila. 40, Pa.

WANTED: Teletype printers, perforators, reperforators transmitter-distributors test equipment: Model #14, #15 #19, #26, #28, etc. All types Collins receivers, 51J R-388, R-390, 75A, etc. Cash or trade for NEW amateur equipment. Write Tom, W 1 AFN, Altronics-Howard Co Box 19, Boston 1, Mass. (Richmond 2-0048).

BARGAINS! Used equipment sold! Traded! Wanted! B other Hams in "Equipment Exchange Bulletin". Sampl copy free! Write: Brand, Sycamore, Ill.

Silicon "Top Hat" Diodes—750 Ma type 800 prv $2.00 ea 1,000 prv $2.50 ea. "Hams" in USA order from: W3MI P.O. Box 197 Homer City, Penna. "Hams" in Canad order from: VE3JL, P.O. Box 76 Postal Station "C Hamilton, Ontario, Can.

Western Electric 416B Tubes. Guaranteed. $10.00 each postpaid. Jim Ariana, Box 285, Kincaid, Illinois.

WANTED: Commercial or Surplus Airborne, Ground Transmitters, Receivers, Testsets. 618S, 18S, 51R, ARN14 GRC, PRC, BC, ARC, Bendix, Collins, Others. RITCO . . Box 156, Annandale, Va.

A-1 reconditioned equipment. On approval. Trades, Terms Hallicrafters S-107 $69.00, S-85 $79.00, SX-99 $99.00 SX-100 $199, SX-111 $179.00, SX-101A $269.00; Hammarlund HQ-100 $129.00, HQ-110 $169.00, HQ-160 $229.00 HQ-170 $259.00, HQ-180 $329.00; Collins 75S-1 $329.00 75A-3 $349.00, 75A-4 $499.00, 32S-1 $499.00, KWS-1 $995.00; Central 10A $79.00, 20A $149.00; National, Gon set, Elmac, Heath, Johnson, RME. Many others. Write fo list. Henry Radio Company, Butler, Missouri.

COLLINS OWNERS WORK AM: Wired Kit $5.00. Ir stant Switching! Install five minutes! Kit Kraft, Harlan, Ky

TOROIDS: 88mhy with mounting hardware Uncased: like new. Information sheet included. $1 ea, 5/$4.00 postpaid KCM, Box 88, Milwaukee 13, Wis.

TERMS AVAILABLE on reconditioned units! Babcock MT-5A—$49.00; KWS-1—$995.00; KWM-1—$499.00; 32V- —$349.00; 30S-1—$995.00; AF-67—$114.95; King 500-C- $499.00; Commander mobile—$59.00; G77—$159.00; HT-3 — $475.00; TBS-50 — $49.95; DX-40 — $59.95; Valiant — $329.00; 75A-3—$379.00; 75A-4—$450.00; 75S-1 — $340.00 HRO60—$299.50; NC-188—$99.50; Write Leo, WØGVQ- WRL—Council Bluffs, Iowa.

MOBILE TRANSISTOR POWER SUPPLY TRANSFORMERS. 220 watt, 700/350 volt $6.95. 120 watt, 500 250 volt, $5.95. 50 watt, 350/175 volt, $3.95. 35 watt, 350/175 volt, $2.95. 6 volt input, 25 watt, $1.95. ALL POSTPAID. CIRCUIT DIAGRAMS FURNISHED WITH TRANSFORMERS. C. F. GRICE, 13114 INDIAN CREEK, HOUSTON 24, TEXAS.

ELECTRONC TIE CLIP—Lucite imbedded 3/9 meg 1/10 watt resistor mounted on high quality clip. Very smart appearance. Ideal gift. Send $2.00 to RK Specialties, P. O. Box 1682, Orlovista Branch, Orlando, Florida. Money Back Guarantee.

BETTER HAM GEAR FOR LESS our slogan on all reconditioned ham gear. Valiant, $259.95. HRO-60-T, $279.95. Send for latest list. We buy, sell or trade. H & H Electronic Supply, 506-510 Kishwaukee St., Rockford, Ill.

WANTED: Surplus receivers, transmitters, BC-348, R-390/URR, AN/GRC-3, to 10. AN/GRR-5, AN/PRC-6 to 10 SB-22/PT, SB-86/P, AN/TCC-7, AN/TRC-24, other signal corps equipment. Surmer, Box 4118 Jersey City, N.J.

ATTENTION MOBILEERS! Heavy duty Leece-Neville 6 volt 100 amp system $50; 12 volt amp system $50; 12 volt 60 amp system $60; 12 100 amp system $100; Built in silicon rectifier alternators 12 volt 60 amps $100; 12 volt 100 amps $125. Guaranteed no ex-police car units. Herbert A. Zimmerman, Jr., K2PAT, 1907 Coney Island Avenue, Brooklyn 30, N.Y., Tel: DEwey 6-7388.

ONE THIN DIME brings 50 page eye-popping war surplus electronics catalog. Fabulous bargains. Meshna, Lynn, Mass

TOROIDS: Uncased 88 mhy like new Dollar each. Five $4.00 P.P. DePaul, 309 South Ashton, Millbrae, Calif

WANTED: TEST EQP'T TS or AN/URM, UPM, ARM, etc. TELETYPE TG-7,Models 15, 19, 2[illegible] 28, printers & repert rators Revrs & xmtrs BC 610E. I; AN/GRC-3 & higher, RT-66, -67, -70, -77, Collins 51J 17L3, -4, 18S-2, R-388 -390, -391; ARN-14 and 30; APK-9, -10, ARC-21, -33, -34, -55; APS-10, -31, -33, -42 et We pay freight Amber Industrial Corp., 75 Varick St., New York 13, N.Y.

Convert any television to sensitive, big-screen oscilloscope Only minor changes required. Plan $1.95 Relco Industries. Box 10563, Houston 18, Texas.

Multiplex Adapter—Circuit board, set of 5 coils, sockets and complete instructions $15.00. D. L. Stoner, Box 7388Q Alta Loma, California.

COMMUNICATION. Teletype. Unusual surplus bargains. Free flyer. MDC 923 W Schiller. Phila 40.

Industrial tubes type 5555 $95.00 ea. frequency shift converters AN-7 URA-6 frequency shift converters $295.00 or will swap for other gear. Spera Electronics, 37-10 33 St., L.I.C., N.Y

TV CAMERA—low cost—easily built—complete schematics, instructions 50¢ Denson Electronics, Rockville, Conn.

WANT FOR CASH:—CQ All 1945 issues; VANTRON Q-Probe; sell or swap QSTs 1939-1959. W4ID 461-3rd Ave., Sea Park, Eau Gallie, Florida.

ALTERNATORS, new, 12V, complete with universal installation kit and transistor regulator. Fully guaranteed Write for details. 30A unit $49.95, 45A $9.95. Electrocom Corp., 115 Ward Street, Boston 20, Mass.

6 & 2 METER FM gear. Surplus police units. Receiver strips $15. Transmitter strips $10. Write for details. Two-Way Radio, 115 Ward Street, Boston 20, Mass.

WANTED: Tubes, diodes, transistors, military, commercial lab-grade test equipment, components, PRC, GRC, equipment, aircraft equipment by Collins. Top Prices. Write details, Bob Sanett, W6REX, V & H Radio Electronics, 2053 Venice Blvd., Los Angeles 6, California.

FOR SALE: Complete instructions including 28 page booklet and 22" x 36" schematic for converting the ART-13 transmitter to AM and SSB. Satisfaction guaranteed. $2.50. Sam Appleton, 501 N. Maxwell St., Tulia, Texas.

TELEVISION CAMERA KIT, easy to build step by step instructions, suitable for Ham TV, educational, industrial, Medical uses. Craftsmen Instrument Labs Inc., 60-30 34th Ave., Woodside, L.I., N.Y.

BARRY Electronics Corp.

OCTOBER SPECIALS

Illumitronic Air Dux: 500 W. Model PI-195-1. **$5.95.**

Illumitronic Air Dux: 1 KW Model PI-195-2. **$14.50.**

G.E. Plate Xfmr: Pri: 115 or 230 @ 60 CPS. Sec: 3525 VAC @ RFB. **$10.75.**

Dow-Key Coax Relay: 52 Ohms/1 KW/115 VAC. #DK60-G2C. **$15.65.**

Dow-Key In Line **Coax Broad Band Pre-Amp:** 1.5 thru 30 MCS. #DKC-RFB. **$10.75.**

Dow-Key Double Male Connector: #DFK-2. **$1.25.**

Dow-Key Panel Mount Connector: #DK60-P. **.70¢.**

Capacitor Sale!!: 800 Mfd./150 VDC; 1500 Mfd./80 VDC; 2500 Mfd./80 VDC; 300 Mfd./40 VDC . . . all **$1.00 each.** 4000 Mfd./50 W.V. @ **$1.25;** 8000 Mfd./55 W.V. (65 Peak) **$2.95.**

B & W Model 850A KW, Pi-Network Inductor: **$35.00.**

Clegg 99'er @ **$159.50.**

Zeus Xmtr. @ $695.00.

Interceptor Recvr @ $473.00.

Rhodes De'uxe 1 Hour Bell Timer: .70¢

Ceramic Antenna Insulator Sale! 4¼"L. 15¢. 6⅛"L. 35¢. Stock up now!

750 Ma./600 PIV Silicon Rectifiers: 36¢ 750 Ma./400 PIV —.37/.

Transistor Pwr Supply: 12 VDC/250 VDC/100 Ma. **$19.90. In stock.**

Drake Low-Pass Filters **/New-Tronics** "Hustler" Antennas and Bumper mounts.

Thomas & Betts De'uxe Wire Welder, with welding gun. Complete-Only **$39.00.**

1800 PIV/700 Ma. FW Rectifier/Tube Substitute 4 Prong. Replaces 5Z3, 80, 83, etc. **$110.**

1800 PIV/700 Ma. FW Rectifier/Octal base tube substitute. Replaces 5U4, 5V4, 5Z4, etc. **$1.10.**

Hammarlund Split-Stator 320/320 Mmfd. Xmtg Capacitor: Deluxe, Ceramic insulation. ¼" shaft. Fully meshed spacing: .08" 3" x 4" x 11". **$3.25.**

Electro-Voice RME6900 SSB/CW/AM Receiver and Matching Speaker. Write for highest trades.

FALL CLEARANCE SALE ON FOLLOWING:

Drake 2B.
NC-400; Autronic Key.
Mosley Antennas.
Tri-Ex Towers.
C.D. Rotators.
Electro-Voice Mikes.
SX-111.
TX-1 Heath Apache
BC-639 VHF Recver.
Courier 500 Watt Linear Amplifier.
HO1C5 TR; SP-600; SP-200:
Model 80.
Sig. Gen.
Altec-Lansing 604B 15" Coax Speaker with Karlson Enclosure.

Full Line of Ameco write or call. **COME IN SATURDAY** . . . From 10 A.M. to 2 P.M. Free parking on Saturday.

Mon. to Fri.: 9 A.M. to 6 P.M.

BARRY ELECTRONICS CORP. DEPT. C-10
512 BROADWAY, NEW YORK 12, N. Y.
WALKER 5-7000 AREA CODE: 212

☐ Enclosed is money order or check and my order. Prices FOB. NYC. Shipments over 20 lbs. will be shipped colect for shipping charges. Less than 20 lbs include sufficient postage. Any overage will be refunded.

☐ Send copy of "Green Sheet" Catalog.

☐ Send information on:.....

☐ I have available for trade-in the following.....

.....

Name .....Title

Company .....

Address .....

City ..... State .....

For further information, check number 51, on page 110

Ready Right Now!

the fabulous HAMMARLUND

HX-50

COME SEE...
COME BUY...

THE NEWEST AND THE BEST

ONLY $399.50 Amateur Net

Walder Electronic Dist.

1801 N.E. 2nd Avenue

Miami 31, Florida

For further information, check number 52, on page 110

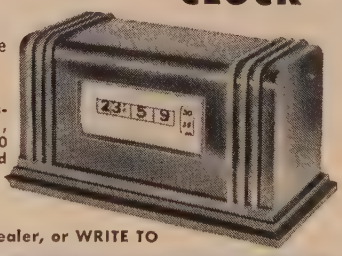
The NEW TYMETER©

"Time at a Glance"

24 HOUR CLOCK

#100-24H1¼

$15 Plus Applicable Taxes



Walnut or ebony plastic case, H4", W7¾", D4". 3 lbs. 110V 60 cy. A.C. Guaranteed 1 year.

At Your Dealer, or WRITE TO

TYMETER ELECTRONICS
PENNWOOD NUMECHRON CO.
7249 FRANKSTOWN AVE., PITTSBURGH 8, PA.

"HOW TO MAKE MONEY IN Mobile Radio Maintenance"

AUTHORITATIVE GUIDEBOOK
ABOUT THE BOOM IN TWO-WAY MOBILE-RADIO: GIVES FACTS, FIGURES, PAY RATES.
WRITE TODAY!

FREE

LAMPKIN LABORATORIES, INC. Electronic Div. BRADENTON, FLA.

SELL: 178 issues QST 1939 thru 1960. From Sept. 1945 thru Dec. 1960 complete. Offer? W2EQS.

QSL'S?? WPE's?? CB's?? Largest variety samples 25¢ (refunded). Religious designs 20¢. Sackers, W8DED, Holland, Michigan.

RUSPRINT QSLs—SWLs 100 2-color glossy $3 postpaid; QSO file cards $1 per 100. Rusprint Box 7507, Kansas City 16, Missouri.

QSL's SWL's XYL-OM's (Sample assortment approximately 9¾¢). Covering dewigning, planning, printing, arranging, mailing, eye-catching, comic, sedate, fantabulous. DX-attracting, protopay, snazzy, unparagoned cards. (WOW!) Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minnesota.

QSL's HIGH GLOSSARY CARDS. Send dime for samples. T. H. Lincoln W1IBB, 18 Hovey St., Woburn, Massachusetts.

500 QSL Cards two colors finest card stock—$5.00. Samples 15¢. Radio Press, 1423½ N. Mariposa Ave., Hollywood 27, Calif.

QSL's . . Nifty . . . Thrifty . . . Dime. Filmcrafters, Martins Ferry, Ohio.

HUNDRED QSLs: 80¢. Samples, dime. Meininger, Jesup, Iowa.

QSLs. Samples, dime. Print Shop, Corwith, Iowa.

QSL's 2-color glossy 100—$2.00. Samples—dime. Frank Ramsbottom, WØYBI, Box 237C, Kirksville, Mo.

QSL's SWL's that are different, colored, embossed card stock and "Kromekote". Samples 10¢. Home Print, 2416 Elmo, Hamilton, Ohio.

QSL—Kromekote 3-Color . . . order 200 get 25 each of 8 different styles—many styles. Samples 10¢. Progress Printing, Box 1154, Biloxi, Miss.

QSL's four colors glossy stock, forty designs—send $5 for 200 and get surprise of your life. 48 hour service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

GLOSSY 3-color QSL cards 100—$4.50. Free sampler Rutgers Vari-Typing Service, 7 Fairfield Road, Somerset N. J.

QSL's-SWL's samples 10¢. Malgo Press, Box 375 M.O. Toledo 1, Ohio.

QSL's SWL's, WPE, CB, Samples—5¢. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Arizona.

QSL's—Samples 15¢. Rubber stamps: Name, Call. Address—$1.35. Harry Sims, 3227 Missouri Avenue, St. Louis 18 Missouri.

MAIL $3.00 annual membership dues and save with these free services: automated QSL card mailing (save more than dues); exciting contests, fast becoming major ham events; Club endorsement; unlimited incoming QSL's; convention activities. Send dues, ask for free brochure. Continental QSL Club, P.O. Box 92, Dabel Station, Dayton 20, Ohio.

QSL cards—BROWNIE—W3CJI—3110 Lehigh, Allentown, Pa., Catalogue with samples 25¢.

CREATIVE QSL CARDS—New catalog and designs being completed. Free samples and catalog. Personal attention given. Wilkins Creative Printing, P.O. Box 1064-2, Atascadero, California.

QSL's 100 $1.25 Free Samples. L. Keller 3036 Ridgeview Normandy, Mo.

QSL—Cards LOW prices—Free Samples. Debbeler Printing, 1309-C North 38th Street, Milwaukee 8, Wis.

WANTED: Old wireless gear, tubes, magazines and catalogs before 1925. Amateur or ship equipment only. Please give complete information including price. My purpose is to buy this equipment, put it in first class shape and make it available either on a museum or demonstation basis to all amateurs who didn't live and operate during this era. W5VA, T. Frank Smith, P.O. Box 840, Corpus Christi, Texas.

Aluminium for every ham need. Write to Dick's, 6 Cherry Avenue, Tiffin, Ohio, for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

WANTED Collins KW-1 Xmitter state price, condition, serial number. W5WB, 702B N. Fillmore, Amarillo, Texas.

GONSET G-76 for sale—late serial number and DC power supply $375. Firm—have gone Sideband. Martin Stern, WA2TYU, 136 E. 55 Street, N.Y.C.

GOING HIGH POWER—need couple: 304TL, 833A, 350TL, 4-250-A, 4-1000A, etc., send best price. R. Levenson, 36 Dahill Rd., Brooklyn 18, N.Y.

SELL: CQ's 1946 to 1959 cheap. One or a dozen. What do you need? Rasmussen, Box 612, Redwood City, Calif.

BARGAINS, in excellent condition HT-32B, NC303, Millen Grid Dipper, reasonable offers considered. R. B. Cooper, 1932 Guild Street, N.E., Grand Rapids 5, Mich.

Globe King 500-C. Excellent condition $425. Will deliver within 100 mile area. K8LTT, 153 Jefferson Park Drive, Huntington, W. Va.

LINE DEMONSTRATOR COMPLETE! Consider offers above $1,000. Original Shipping! Amateur, Box 763, Harlan, Ky.

HEATHKIT SSB Mobile Package, used 10 hours. HX-20, HR-20, HP-20, HP-10 Kit, EV729SR mike, $350. Heathkit transistorized all brand receiver with AC supply parts, 50 hours use, $100. Leaving U.S. Must sell by October 19. BOB John Jellema, W8SWN, Zeeland, Michigan.

Viking I TVI'd with spare 4D32 and 122 VFO, $135; National 240D rack mounting receiver, modified front end. Following Heathkits: 5" Laboratory oscilloscope, SG-8 RF Generator, AG-9A Audio Generator, TC-2 Tubetester, HP-11 Vibrator power supply, V-6 VTVM. All in excellent condition with books. Make offer or trade for VHF or mobile gear. WA2EWV, 219 Forest Drive, Linwood, N. J.

Millen SWR bridge $700; 115ft. RG-59/U $4.00; New tubes 7094 $10.00; 4E 27/8001, $6.50. WA2FKZ, Box 571, Hewitt, New Jersey.

CLASSIC—AMR-100 (Australian HRO) all coils 480Kc to 26Mc. Worked 9 countries last mo. with schematic $40. P.O.B. San Jose—85 lbs.—W6GXK, 6582 Canterbeury Ct., San Jose 29, Calif.

COLLINS 75S1 receiver. Practically new, perfect, can't use, insides never touched. Service manuals, etc., included. Will ship in original carton $400. Details, Suite 6K, 8420 91 Ave., Elmhurst, N.Y.

FOR SALE: B&W 852 inductor $25. 20-675 uufd 10K volt vacuum variable with counter dial $30. B & W FC-30 filament choke $6. Eimac SK-500 Air systems socket $11. Hardwell 1500 uufd variable $9. National #375 choke $2.50. 50CFM 115 VAC blower $7. Western Model 301 meters, 0-1000 MA, 01300 MA $4.50 each. Larry Kleber, K9LKA/W9CPD, Belvidere. Illinois.

WANTED: 4000-0-4000 VAC power transformer 500 or 750 MA or complete supply. Larry Kleber, K9LKA/W9CPD, Belvidere, Illinois.

FOR SALE: Heath DX-40 and Heath VFO in mint condition $55. DX-40 submounted on 19" black crakle rack panel with matching knobs. Panel easily removed. Larry Kleber, K9LKA/W9CPD, Belvidere, Illinois.

Still some items left! New Mosley 20 meter 3 element beam $25.00, Gonset 2 & 6 VFO $24.00, Smith CW oscillator $7.50, PNP Audio Transistors 10 for $1.00, general purpose germanium diodes 25 for $1.00, other items, stamp for list. H. Sam Kofsky, 201 Eastern Parkway, Bklyn 38. N. Y.

For Sale—plastic laminating press, Warner model 100B, used for pictures, clippings, etc. Good Condition. Jack Whichester, 33 Cedar Rd., 9800 W. Joliet Rd., LaGrange, Ill.

FOR SALE:—KWM-2, A.C. and D.C. supplies; mobile rack; micro-match; 20 and 40 meter heliwhips and mount; mike. Little used. K2HEA, 12 Elm St., Lynbrook, N.Y. FY 9-2356.

HALLICRAFTER SX-43 for sale. Excellent condition 550 kc. to 54 mc. AM, 44 mc.—108 mc. FM. 115 v. power supply. $125. M. W. Mitchell, 2802 Capella Ct., Conelson, Penn.

FOR SALE: Heach DX-40, excellent $50.00; like new Gonset G-76 with mike and 12v pwr supply $400.00—without pwr supply $325.00; Mark Heliwhips—triband $15.00, 80 meter and 40 meter $8.00 each. KØDJX, 2004 Sampson, Muscatine, Iowa.

FL-8
FL-5F
FILTERS

These extremely selective audio filters have six tuned circuits and can be used either to peak a signal of 1020 cycles or reject it. The filter is very simple to use. Just connect it in the headphone line, or at the input to your last audio stage . . . that's all there is to it.

They are an outstanding success for CW operations as one of the greatest single-signal circuits ever devised. When you switch to "peak" all you hear are 1020 cycle signals, with everything else filtered out. On phone you switch to "null" and take out heterodynes. One filter gives you better than .8 kc (to 60 db down) selectivity. If you are interested in seeing what 2 or more will do, check Nov. 1957 CQ, pg. 60, showing how 4 are used for a selectivity of 150 cycles at 50 db down! You can also read all about the filter in the March 1962 issue of 73 in the W4THU article: "Cure That Angry Band."

Filters normally sell for about $5 each, when you can find them. The FL-8 has a switch built in, and the FL-5 requires an external switch to change from peak to null to out. The FL-5 is ideal for building into gear, while the FL-8 is handier to use outboard. Just try one of these filters and see what a difference it makes!

Included *free* with your order is booklet with suggestions for most effective use of filters, complete with detailed schematics!

POSTPAID $2.49 ea.

ORDER YOURS TODAY!

Please send me.....FL-8 Filters at $2.49 ea.

.....FL5F Filters at $2.49 ea.

Name.....

Address.....

City.....Zone....State.....

SEG SALES

4117 W. Jefferson Blvd.
Los Angeles 16, Calif.

Enclose check or money order.
Calif. residents include 4% sales tax
Include 25¢ Postage Per Unit

For further information, check number 53, on page 110

Ready Right Now!

the fabulous HAMMARLUND

HX-50

COME SEE...
COME BUY...

THE NEWEST AND THE BEST

ONLY $399.50 Amateur Net

WALKERADIO

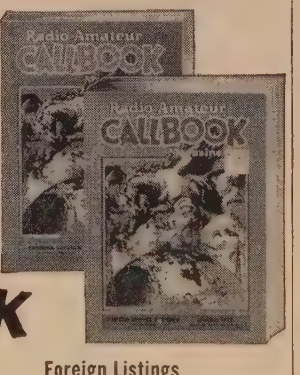
1546 Fulton Road, N.W.

Canton 3, Ohio

For further information, check number 54, on page 110

THREE IMPORTANT REASONS WHY YOU NEED THE

NEW, FALL 1962 CALLBOOK



- If your present CALLBOOK is only a year old, over 20% of the listings have been changed or added!

Foreign Listings (All outside U.S.) $3.00

U.S. Listings (All K and W calls) $5.00

- Over 16,000 new amateurs added since the Summer, 1962 issue—biggest license increase in history!
- Completely revised essential data—latest international prefixes, Q signals, postal info., airline distances, time chart, etc.

Now on sale at your amateur equipment dealer; if not conveniently located you may order by mail (please add 25¢ for mailing) from:

RADIO AMATEUR CALLBOOK, INC.
Dept. C, 4844 Fullerton Ave., Chicago 39, Ill.

P.S. Write for illustrated brochure on exclusive WORLD ATLAS . . . DX GUIDE . . . SPECIAL FULL COLOR MAPS.

SELL: Drake 2B Xtal calib, Q-Mult & Speaker—1 week old $270; ELDICO-SSB-100F $400; RME-4303 CB Walkie-Talkies—Pair $80; all like new & FOB—Lamb, 1219 Yardley Rd., Morrisville, Pa.

AIRPLANE: trade beautiful Piper Tripacer 135HP—only 325 hours—ARC OMNI—value 5KBUX—for Collins other top ham equipment—good telescope—cash—W8VZ, Marietta, Ohio.

ELMAC AF 67 & PMR7 w/pwr supply sell for $195 WA2DCA, 9 W Cedar Ave., Merchantville 8, N. J. Phone NOrmandy 3-5512.

GPR-90 communications receiver, excellent condition $295 Jack Holzman, 9021 Melrose Ave., L. A. 69, Calif CR 3-4960 Days.

SELL: Kreco ground-plane antennas, 15 and 20 meters Complete with radials and stubs. $20 each—both for $35 W2EQS.

WANTED: Viking Ranger, factory wired, perfect condition—will trade either DX100B or Vespa Scooter 1500 miles —Write WA6JPQ, P.O. Box 1263, Canoga Park, Cal.

Syracuse VHF Club 8th Annual Roundup October 6, 1962 Three Rivers Inn; outstanding speakers, awards, dinner floor show. This is one to attend if you want a day you'll long remember. Bring the wife, there is a program for her too. Write Joseph Bancheri, Sec., WA2ADG, 15 Westfal Dr., Syracuse 9, N.Y.

COMPLETE STATION: Factory wired Ranger II, Drake 2-B. D-104 mike. SWR meter, coax relay. Used 2 hours Mint condition. First $520.00 takes all. Lt. Col. William Schlarb, Hq, 2nd Logistical Command, Fort Lee, Virginia

SELL: HQ 129X, best offer over $105.00. Viking 6-2 meter converter $35.00. No Shipping, must pick up personally F. Corliss, 6431 Ave. A., New Orleans, La.

VALIANT, excellent, $275. Hal Crispell, 4261 Santa Cruz San Diego 7, Calif.

75 Mtr Swan with Heath mobile power supply and New Tronics for sale or trade for 20 mtr Swan. Bob Heil K9EID. Marissa, Illinois.

S-38C NR66c772 $32; NC-33 NR2150313 $35; working condition, postpaid continental USA. Want Blue Racer Bug Drake 2B; state price, model/serial condition. W6MMC/7 Box 412. Sedona. Arizona.

H.V. Plate Transformer. Sec. 6000 V.C.T. or 7000 V.C.T at 1 Amp. Pri. 0-208-220 V. 60 cy. Single Phase. Sealed Ceramic Insulators. 13"H by 10"W by 15"D. $55. Viking 1 Trans. 10M to 160M 100 Watts. Good condition $90.00 FOB 75 miles NYC. J. R. Pyryt, 192 Norman Way, Paramus, N. J.

HQ-129X Modified May 1959 *CQ* $110. CE Model A slicer with AP-1 adapter $50 Combined $145. Gonset Super Six (12 volts) $30. James Mobile Power Supply model C 1050 $25. Homebrew 160/80/20/10 meter transceiver 10 watts $25 Hallicrafter S-95 $35. K8ABW, 205 Garland Davison, Mich.

FOR SALE—Knight R-55 communications receiver. Excellent condition. Perfect for beginner $60. John Louth 442 Jefferson Ave., Urbana, Ohio.

FOR SALE: TX-1 Apache, HQ110-C, with Dow Key relay and low pass filter. Package deal, like new $475.00 Amos H. Carmical, K4IZU, 521 Fleda Rd., Memphis 17, Tenn

TRADE—BC610 with BC614 Speech Amp. in xlnt condxn For Apache or Equiv. or sell for best offer. K8HRX, 95 Kohler St., Kenton, Ohio.

SELL: HRO 60 with all coils—$255, Gonset III Communicator 2 meter like new—$175. W6OXB, Rt. 2 Box 973, Modesto, Calif.

4CX1000A new $75. SK-800A socket $25; APS-15A with instructions $160; TS-120 X-band Signal Gen. $45; RCA TV camera & transmitter $50; KWS-1, 75A-4, with F.T knobs, 3 mech filters, antenna relay, pair extra 4CX250B new condition all for $1395. D. E. Pennington, 4516 Garfield Ave, Dallas 11, Texas.

FOR SALE—Collins 75S1 Excellent condition looks like new $350.00. George P. Rankin, 920 Curry Dr., Macon, Ga

For Sale: Hallicrafters SX100 $240. Also Hammarlund HQ145 with clock $200. Both like new. Robert Burns 522 E. Center, Warsaw, Indiana.

ling Out—KWS-1, 75A-4, Station Control, Beam, Telrex, tor, Miscellaneous. All in New Condition. High serial mbers. All letters answered. Frank Lindsay, Holdrege, braska

DING MOBILE FOR COLLEGE. Must Sell my NC-303. rfect Condx. under 1 year old—$300. Dain, K8MLR, 932 nwood Dr., Kettering 29, Ohio.

ANTED: Electrical or control part of manual on Signal rps power unit PE141A Manuacturer Federal Telephone l Radio Corp. W4NFC.

LL or TRADE—1908 Oldsmobile—Replica. Like new. int KWM-2 with power or other gear. Leo Avazian, reston, Iowa.

ANTED—model 15 teletype table in good condition. rris W. Zuelke, 4619 N. Magnolia Ave., Apt. 307, icago 40, Illinois.

rroid Cor's—88 m h. Clean—$1.00 or 1, $3.00 or 5. stpaid. WØLFH, Algona, Iowa.

OR SALE—40' Triangular Steel Tower never assembled—0.00; Johnston 'Matchstik' Vertical with control box, ver used—$80 00; Telrex Tribander beam never used, g. carton—$90.00; Beam rotator (Mims overhauled) cro switches added w/controls $90.00. Pick-up, no ship-g. W2ZM, Locust Valley, N. Y.

EED CASH FOR COLLEGE. Selling SX-101A $235 so DSB-100, HT-18 VFO all offers considered. K9GRS/2, x 731, Troy, N. Y

O-170, mint condition. Best offer takes it. Ed Lauster, A2MXW, 209-14 82 Ave., Queens Village 27, N. Y. Tel O 8-5320.

OR SALE: Hallicrafters S-108 receiver. like new. $100. rry Long, 1907 Nueces, Austin 5, Texas.

OR SALE: Collins 75A-4 Serial #5721 latest model, th 3 kc and 6 kc mech. filters. Rack mounting hardware. maculate, under 100 hours use. $600 firm. Prefer local le, will deliver within 20 miles. Cash or certified check. 2EEK, 75-15 177 St., Flushing 66, N.Y. Tel: Ja 3-5420 er 7 PM.

OR SALE—Collins 75A-4 Serial number 5721. Latest odel with 3 kc and 6 kc mech. filters. Rack mounting rdware. Immaculate, under 100 hours use. $600 firm. efer local sale, will deliver within 20 miles. Cash or rtified check. K2EEK, 75-15 177 St., Flushing 66, N.Y. l. JA 3-5420 after 7 p.m.

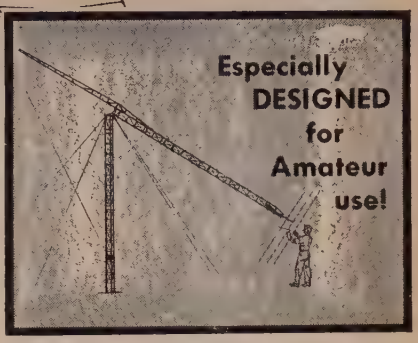
DOW-KEY CONNECTORS

PANEL MOUNT
Durable, silver plated, precision made. Only ⅜" hole is needed, no screws.
ea. 70

DOUBLE MALE
Favorite everywhere. Precision made, rugged locking type. Silver plated.
ea. . . . 1.25

DOW-KEY COMPANY, Thief River Falls, Minn.

ROHN "fold-over" TOWERS*



first **IN DESIGN** *foremost* **IN SALES**

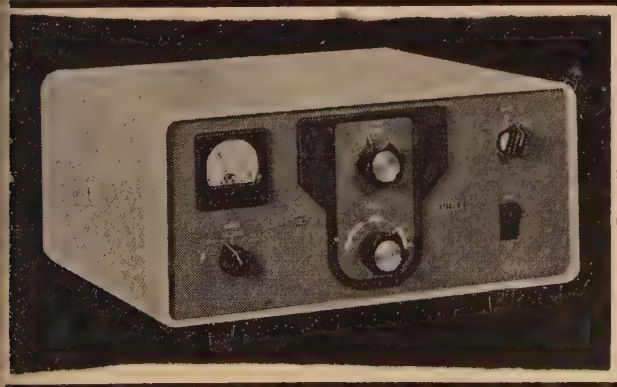
ROHN "fold-over" towers are ESPECIALLY made for amateur use. They are the most practical tower in design because they allow you to work ON THE GROUND for antenna maintenance and servicing. You'll quickly agree that this is a most wonderful feature for an amateur tower. In addition, these towers are made and designed for true heavy duty use. They are structurally sturdy for use up to 70 feet and in enough sizes for *all* types and sizes of amateur antennae. This means that they can easily handle your requirements. They have unexcelled workmanship. They are hot-dipped galvanized after fabrication which means you have no problem of maintenance. They come as a complete package with all materials and accessories included. Add all these wonderful features together and you see why they're the most demanded tower today! Priced from $186.

FREE literature and near source of supply gladly sent. Be Sure you investigate ROHN towers before buying!

*Patent—2,875,865

ROHN *Manufacturing Company*
Box 2000 • Peoria, Illinois
"World's largest exclusive manufacturer of TV-Communication towers"

For further information, check number 55, on page 110



HOW COMPACT CAN YOU GET? (as compact as Collins has made the 30L-1). This tightly engineered, new 1000-watt linear amplifier is the same size as the famous Collins KWM-2. It has a self-contained power supply, too. Its price: $520. Its appearance "solid quality". Order the Collins 30L-1 now, for early delivery.

C & G ELECTRONICS
Northwestern headquarters for Collins
2502 Jefferson Avenue, Tacoma 2, Wash.
2221 3rd Avenue, Seattle 1, Wash.

For further information, check number 56, on page 110

Ready Right Now!

the fabulous HAMMARLUND

HX-50

COME SEE...
COME BUY...

THE NEWEST AND THE BEST

ONLY $399.50 Amateur Net

WAVERLY WHOLESALE

Waverly, Illinois

For further information, check number 57, on page 110

READER SERVICE

CQ Magazine, Dept. RS

300 WEST 43rd STREET
New York 36, N. Y.

Coupon K
Void after
Oct. 25, 1962

Please send me more information on your ads in the Oct. 1962 *CQ* keyed as follows:

1	2	3	4	5	6	7	8	9	10	A
11	12	13	14	15	16	17	18	19	20	B
21	22	23	24	25	26	27	28	29	30	
31	32	33	34	35	36	37	38	39	40	C
41	42	43	44	45	46	47	48	49	50	D
51	52	53	54	55	56	57	58	59	60	E

Total Inquiries ☐

NAME_____
(Please Print)

Type of work (specify)_____

ADDRESS_____

CITY_____

ZONE_____ STATE_____

CQ ADVERTISER'S INDEX

Algeradio Electronics Company 85
Allied Radio Corporation ..... Insert, 97
Alltronics-Howard Company 103
Amateur Electronic Supply 89, 111
Amateur Radio Equipment Co. 82
ASTATIC 12

Barker & Williamson, Incorporated 11
Barry Electronics Corporation 105
Bruce Electronics 84

C & G Electronics Company 88, 109
Centralab 18
Cleveland Institute of Electronics 9
Collins Radio Company ..... Cover III
Communications Equipment Company 91

Davis Electronic Supply Co., Inc. 90
Denson 82, 91
Dow-Key Company, Incorporated 90, 109

E-Z Way Towers, Incorporated 104
EICO 5
Electronic Center, Inc. 91
Electronic Specialties 92
Evans Radio, Incorporated 83, 96

Fair Radio Sales 99
Finney Company, The 16

Gonset Company 100
Gotham 81
Graham Radio Inc. 84
Greenlee Tool Company 96
Gulf 98

Hallicrafters Company 2
Hammarlund Manufacturing Company 6
Harvey Radio Company, Incorporated 87
Heath Company 20, 21
Hornet Antenna Products Company 1
Hy-Gain Antenna Products 1

Instructograph Company 9
International Crystal Manufacturing Co. 4

Johnson, E. F. Company 1

Lafayette Radio 93, 11
Lampkin Laboratories, Incorporated 10

Millen, James Mfg. Co. Inc. 1
Mosley Electronics, Inc. 1

National Radio Company, Incorporated ..... Cover II
New Products Co. 10
New-Tronics 1

P & H Electronics 8
Pennwood Numechron Co. 10
Petersen Radio Co. Inc. 1
Priest Electronics, Inc. 9

R & R Electronic Supply Co. 10
RCA (Electron Tube Division) ..... Cover IV
Radio Amateur Call Book, Inc. 10
Radio Products Sales Company 10
Radio Shack Corp. 8
Raytronics 8
Rohn Manufacturing Company 10
RSE Ham Shack 10

S.E.G. Sales 10
Shure Brothers Inc. 8
Slep, Bill Company 8
Space Raider Antenna 9

Telrex, Laboratories 10
Texas Crystals 10
Trigger 10
Tristao 9

U.S. Crystals, Inc. 10
Vanguard 8
Vibroplex Co. Inc. 9

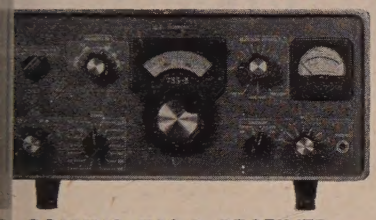
Walkeradio 10
Walder Electronic Dist. 10
Waverly Wholesale 11
Western Radio Co. 9
World Radio Labs Inc. 1

Here is the reason
WE CAN OFFER YOU
the radio industry's absolutely

LOWEST FINANCING COST

on your new

COLLINS EQUIPMENT!



COLLINS 75S-3 RECEIVER
Ham Net $680.00

e'll give you a really fantastic trade-in owance on your new 75S-3—special this nth. Trade now and see how much re you save!

✓ $5.00 DOWN PAYMENT
✓ 5% MAXIMUM FINANCE RATE
✓ TAKE 1-2-3 YEARS TO PAY
✓ 6 MONTHS PAY-OFF OPTION

The picture above is Main Street in a small town in Wisconsin. Up here the pace is slower and things cost less. Our bank in the picture agreed to handle payments on all Collins equipment sales we bring them at the astonishingly low rate of 5% . . . because Hams, in general, have such good credit standing and because our bank recognizes *Collins Quality*—and also that Collins radio equipment retains its value year after year. This is just about half what it costs you to finance anywhere else. If you don't believe us, compare our monthly payments. In addition, if you make five regular payments and decide to pay up in full at the end of six months, you get FULL CREDIT for all finance charges paid to date! Any Collins equipment you want is in stock right now . . . yours for just $5 down; up to three years to pay.

$5 DOWN DELIVERS ANY NEW COLLINS GEAR

	Amateur	1 yr.	2 yrs.	3 yrs.
30L-1 Linear Amplifier	$520.00	$45.06	$23.60	$16.45
30S-1 Linear Amplifier	1556.00	135.71	71.08	49.54
32S-3 Transmitter	750.00	65.18	34.14	23.79
75S-3 Receiver	680.00	59.06	30.93	21.56
75S-3A Receiver	750.00	65.18	34.14	23.79
KWM-2 Transceiver	1150.00	100.18	52.47	36.57
KWM-2A Transceiver	1250.00	108.93	57.06	39.77
DL-1 Dummy Load	58.00	5.04	2.52	1.68
351D-2 Mobile Mount (KWM-2)	120.00	10.20	5.27	3.67
MP-1 14V DC Power Supply (KWM-2)	198.00	16.88	8.84	6.16
PM-2 Portable Power Supply (KWM-2)	150.00	12.70	6.64	4.63
516F-2 AC Power Supply (32S/KWM-2)	115.00	9.79	5.04	3.51
312B-3 Speaker (S-Line)	32.00	2.87	1.43	.95
312B-4 Speaker Console (S-Line, KWM-2)	195.00	16.62	8.70	6.06

	Amateur	1 yr.	2 yrs.	3 yrs.
312B-5 PTO Console (KWM-2)	$350.00	$30.18	$15.81	$8.24
399C-1 PTO Speaker (KWM-2)	164.00	13.66	7.28	5.07
SM-1 Fixed Station Microphone	32.00	2.87	1.43	.95
SM-2 Fixed Station Microphone	48.00	4.20	2.10	1.53
MM-1 Mobile Hand Microphone	25.00	2.29	1.14	.76
MM-2 Mobile Boom Microphone with Earphone	39.00	3.45	1.72	1.15
MM-3 Mobile Boom Mike	27.00	2.45	1.22	.81
302C-3 Directional Wattmeter	130.00	11.04	6.25	3.99
440E-1 Cable (516E-1 to KWM-2)	17.00	1.62	.81	.54
136B-2 Noise Blanker (KWM-2)	124.00	10.54	5.45	3.80
TD-1 Antenna	152.00	12.87	6.73	4.69
F455J-05 Mechanical Filter	77.50	6.66	3.33	2.31
F455J-15 Mechanical Filter	58.00	5.04	2.25	1.69
F455J-21 Mechanical Filter	57.50	5.00	2.50	1.67
F455J-31 Mechanical Filter	57.50	5.00	2.50	1.67
F455J-60 Mechanical Filter	57.50	5.00	2.50	1.67

nimum order that can be financed for one year is $60, two years $120, three years $180. Persons signing time-pay contracts must be 21 ver and employed.
s low finance rate applies only to new Collins equipment. Offer is subject to withdrawl without notice.
rida Hams—Visit our NEW location Amateur Electronic Supply, 23 Azalea Park Shopping Center, Orlando, Florida.

AMATEUR ELECTRONIC SUPPLY

Two Stores to Serve You
PLEASE SEND MAIL ORDERS TO MILWAUKEE STORE

MANAGER, STEVE, W9EAN

MA[illegible]

MILWAUKEE, WISCONSIN
3832 Lisbon Avenue
Phone: WEst 3-3262

CHICAGO, ILLINOIS
[illegible]450 Milwaukee Avenue
hone: ROdney 3-1030

C-102
Amateur Electronic Supply—*Mail Order Dept.*
3832 W. Lisbon Ave., Milwaukee 8, Wisconsin

Ship me .....

I enclose .....: I will pay the balance in

☐ 1 year ☐ 2 years ☐ 3 years

I want to buy ..... and want to trade

.....What's your deal?

Name .....

Address .....

City .....*Zone*.....*State* .....

☐ Send reconditioned equipment and sale bull tin.

further information, check number 58, on page 110

FREE!

FOR '63

Mail the coupon today for your **FREE** copy!

388 Giant Size Pages

LAFAYETTE RADIO ELECTRONICS

1963 CATALOG NO. 630

42 years of serving the Amateur

IT'S FROM THE "WORLD'S ELECTRONICS SHOPPING CENTER"

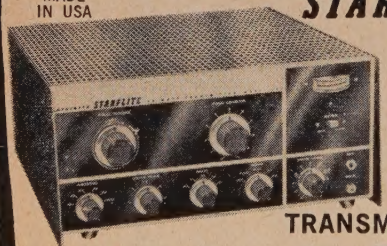
HERE IT IS . . . the exciting, all-new 1963 Lafayette. 388 giant-sized pages. The largest in our history . . . Thousands of items. 24 hour service at the lowest, money saving prices.

Select from large variety of — **Amateur Equipment • Citizens Band • Test Instruments • Mobile and Fixed Station Equipment • Amateur Accessories and Parts Antennas • Tape Recorders • Hi-Fi • Tubes • EXCLUSIVE LAFAYETTE KITS and much more.**

3-IN-1 EASY PAY PLAN — choose the plan that suits you best. **No money down**, up to 24 months to pay.

SATISFACTION GUARANTEED OR MONEY REFUNDED

MADE IN USA



STARFLITE™

90 WATT PHONE and CW TRANSMITTER KIT

COMPARE QUALITY! COMPARE PRICE!

KT-390 **79.50** NO MONEY DOWN

• 90 Watts Phone or CW on 80 Thru 10 Meters • Built-in 3-Section Low-Pass Filter • Clear, Chirpless Grid Block Keying

Dollar for dollar you can't beat this new Lafayette **Starflite** transmitter. Easy to build and operate, it glistens with quality and performance all-over. Features in addition to those listed above: 5 crystal positions and provisions for external, VFO, illuminated edgewise panel meter and pin-net work output for proper antenna match. Buy one now — we know you'll be satisfied with it.

THE LAFAYETTE HE-30

Professional Quality Communications Receiver

99.95 NO MONEY DOWN

• TUNES 550 KCS TO 30 MCS IN FOUR BANDS • BUILT-IN Q-MULTIPLIER FOR CROWDED PHONE OPERATION • CALIBRATED ELECTRICAL BANDSPREAD ON AMATEUR BANDS 80 THRU 10 METERS • STABLE OSCILLATOR AND BFO FOR CLEAR CW AND SSB RECEPTION • BUILT-IN EDGEWISE S-METER

Sensitivity is 1.0 microvolt for 10 db. Signal to Noise ratio. Selectivity is ± 0.8 KCS at —6db with Q-MULTIPLIER. TUBES: 6BA6—RF Amp, 6BE6 Mixer, 6BE6 OSC., 6AV6 Q-Multiplier—BFO, 2-6BA6 IF Amp., 6AV6 Det-AF Amp. ANL, 6AQ5-Audio output, 5Y3 Rectifier.

LAFAYETTE RADIO

Please include shipping charges with order

111 JERICHO TURNPIKE, SYOSSET, L. I., N. Y.

New York, N.Y.	Jamaica, N.Y.	Newark, N.J.	Bronx, N.Y.	Paramus, N.J.	Boston Mass.	Plainfield, N.J.	Scarsdale, N.Y.
100 6th Ave.	165-08 Liberty Avenue	24 Central Avenue	542 E. Fordham Rd.	182 Route 17	110 Federal Street	139 W. 2nd Street	691 Central Pk Avenue

CUT OUT AND PASTE ON POST CARD

LAFAYETTE RADIO Dept. CJ-2
P.O. Box 10 Syosset, L. I.

Send me the FREE 388 Page 1963 Catalog No. 630

NAME.....
ADDRESS.....
CITY.....ZONE.....STATE.....

For further information, check number 59, on page 110

NATIONAL'S NEW NCX-3 Tri-Band Transceiver!

Complete SSB, AM and CW coverage of the 80, 40, and 20 meter amateur bands!

- **Full 200 watts PEP!**
- **Every desirable operating feature!**

NATIONAL ONE YEAR GUARANTEE

Now from National — a brand-new Transceiver concept that brings you the three most popular amateur bands at a price equivalent to economy single-band units! No need to compromise on only one band — no need to spend a $300 to $800 premium for coverage of the two steadily deteriorating high frequency bands! The handsome, rugged, NCX-3 complements both your car and the ham shack, and provides you with a solid 200 watts of SSB punch — plus — every feature National could think of for easy, relaxed ham band operation — vox or push to talk, CW break-in, SSB/CW AGC, S-meter — even a separate AM detector! The specifications below really tell the story . . . study them carefully and see your National dealer as soon as possible. We're devoting additional production facilities to the NCX-3 to assure maximum delivery rate, and will start delivery December 30 — don't postpone your enjoyment of the new NCX-3 — get your advance order in now!

NCX-3 SPECIFICATIONS

Frequency Range: 3.5, 7.0, 14.0 Mc. amateur bands • Types of Emission: SSB (LSB 80 and 40 meters, USB 20 meters), AM (SSB with carrier inserted), CW • R. F. Power Input: 200 watts SSB PEP, 180 watts CW, 100 watts AM • R. F. Power Output: 120 watts SSB PEP, 108 watts CW, 30 watts AM • Output Impedance Matching Range: 40-60 ohms • SSB Generation: 5200 Kc crystal filter; bandwidth 2.5 Kc at 6 db • Frequency Stability: 400 cyles long-term after warm-up • Suppression: carrier —50 db; unwanted sideband —40 db • Operating Facilities: all modes —full AGC and S-Meter on receive; SSB-VOX or PTT transmit, product detector on receive; AM—VOX or PTT transmit, separate diode detector on receive; CW — grid block break-in transmit, product detector on receive • Audio Input: High impedance, low level • Controls: Front panel — Main Tuning, Band Selector, Audio Gain, R. F. Gain, Microphone Gain, Mode (off, SSB, AM, CW, tune), Carrier Balance, Driver Tune, PA Tune, PA Load; Rear panel — Vox Sensitivity, Anti-Vox, Vox Delay, Bias Adjust, Vox Input, PTT Input, Key, Phones, Ext. relay • Metering: PA cathode current on transmit; S-Meter on receive • Receiver Sensitivity: 1.0 μV. for 10 db S/N ratio • Receiver Selectivity: 2.5 Kc at 6 db • Receiver Audio Output: Better than 2 watts; 3.2 ohms • Size: 6" H., 13⅝" W., 11⅝" D. • Shipping Weight: 20 pounds • Power Requirements: 700 V.D.C. @ 300 ma., 280 V.D.C. @ 100 ma., —80 V.D.C. @ 10 ma., 12.6 V. @ 5A. • Tube Complement: 17 tubes, 4 diodes; parallel 6GJ5's in final amplifier. Mechanical: ⅛" solid extruded aluminum front panel; perforated steel enclosure; cadmium plated steel chassis; chromium plated steel mobile mounting bracket. • Main Tuning Ratio: 45:1, employing planetary and split gear drive. • Finish: Front panel — Hydro-etch off-white matte with brushed aluminum trim; Knobs — Mil-Spec, matte black; Enclosure — gray-blue wrinkle enamel. • Accessories: NCXA 115 V.A.C. power supply/speaker console; NCXD 12 V.D.C. power supply • Price: Your National dealer has complete price information ready for you — call him today for a very pleasant surprise! (at the same time, why not check his trade-in allowance on your present AM or SSB rig toward a new NCX-3?)

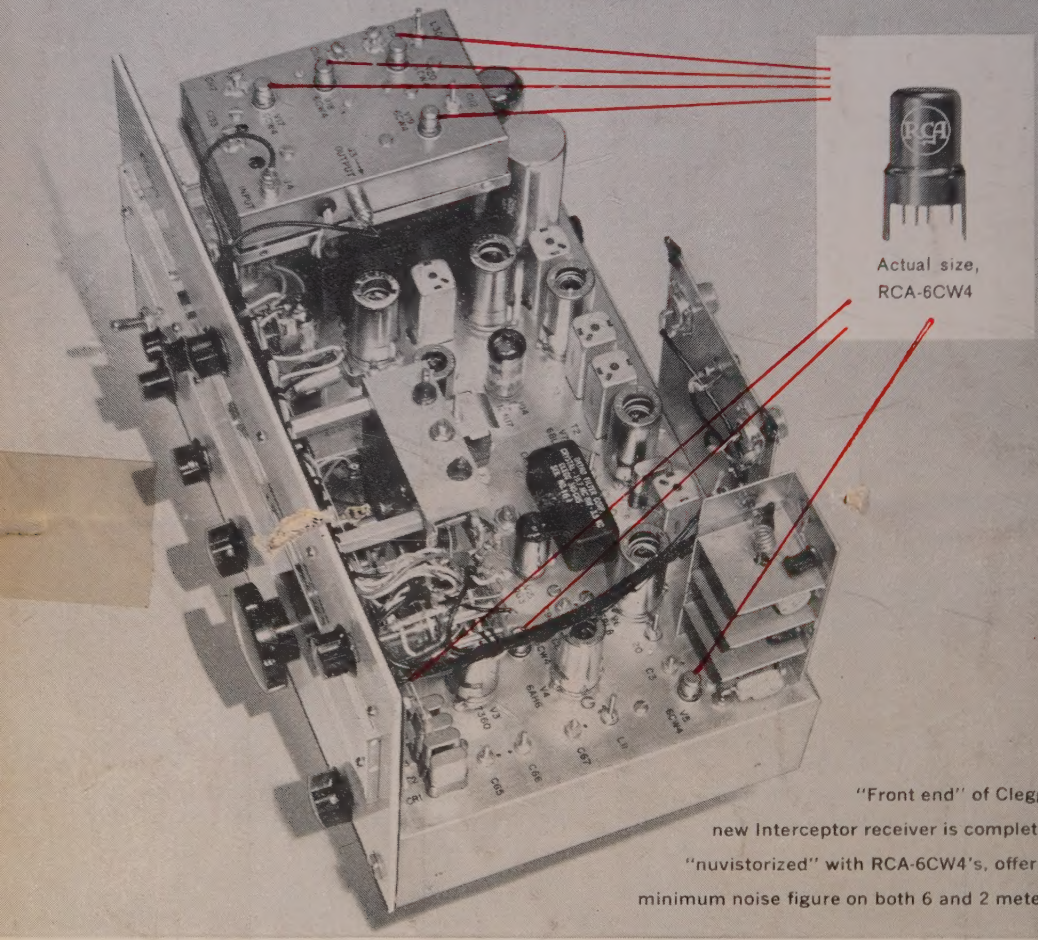
National Radio Co., Inc.®

National Radio Company, Inc., Melrose 76, Mass. Dept. 0000 C 10
A Wholly Owned Subsidiary of National Company, Inc.
World Wide Export Sales: Ad Auriema Inc., 85 Broad St., N.Y.C. Canada: Tri-Tel Assoc., 81 Sheppard Ave. W., Willowdale, Ontario

For further information, check number 60, on page 110

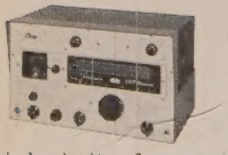
"Nuvistorized" BY CLEGG

NEW INTERCEPTOR RECEIVER USES 7 RCA-6CW4 NUVISTORS IN THE "FRONT END"



Actual size, RCA-6CW4

"Front end" of Clegg's new Interceptor receiver is completely "nuvistorized" with RCA-6CW4's, offering minimum noise figure on both 6 and 2 meters.

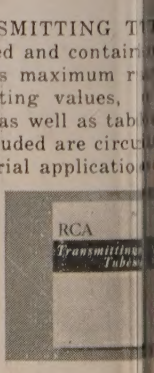


If you're really serious about 6 and 2 meters, check out the operating capabilities of Clegg's Interceptor—the all-new VHF receiver featuring 7 RCA-6CW4 high-mu nuvistor triodes in its rf, converter, and if sections.

About the size of a thimble, these self-shielding triodes provide outstanding amplifier, oscillator, and mixer service in amateur gear. Because of their low noise and high signal-gain characteristics, RCA 6CW4's help pull in those weak signals. And the nuvistor design, featuring RCA's "Dark Heater" for long and dependable performance, assures exceptional uniformity from tube to tube, ruggedness, and long-term stability.

The new edition of RCA TRANSMITTING T (TT-5) has been extensively revised and contain on over 180 tube types. It includes maximum r characteristics, and typical operating values, tube circuit-design considerations, as well as tab quick, easy tube selection. Also included are circu grams for transmitting and industrial applicatio new design information on linear rf amplifiers for single-sideband service. Available from your RCA Electron Tube Distributor or Section J-15-M Commercial Engineering, RCA Electron Tube Division, Harrison, N. J.

(Optional List Price: $1.00)



RCA-6CW4 nuvistors are available from your RCA Electron Tube Distributor.

RCA® THE MOST TRUSTED NAME IN ELECTRONICS